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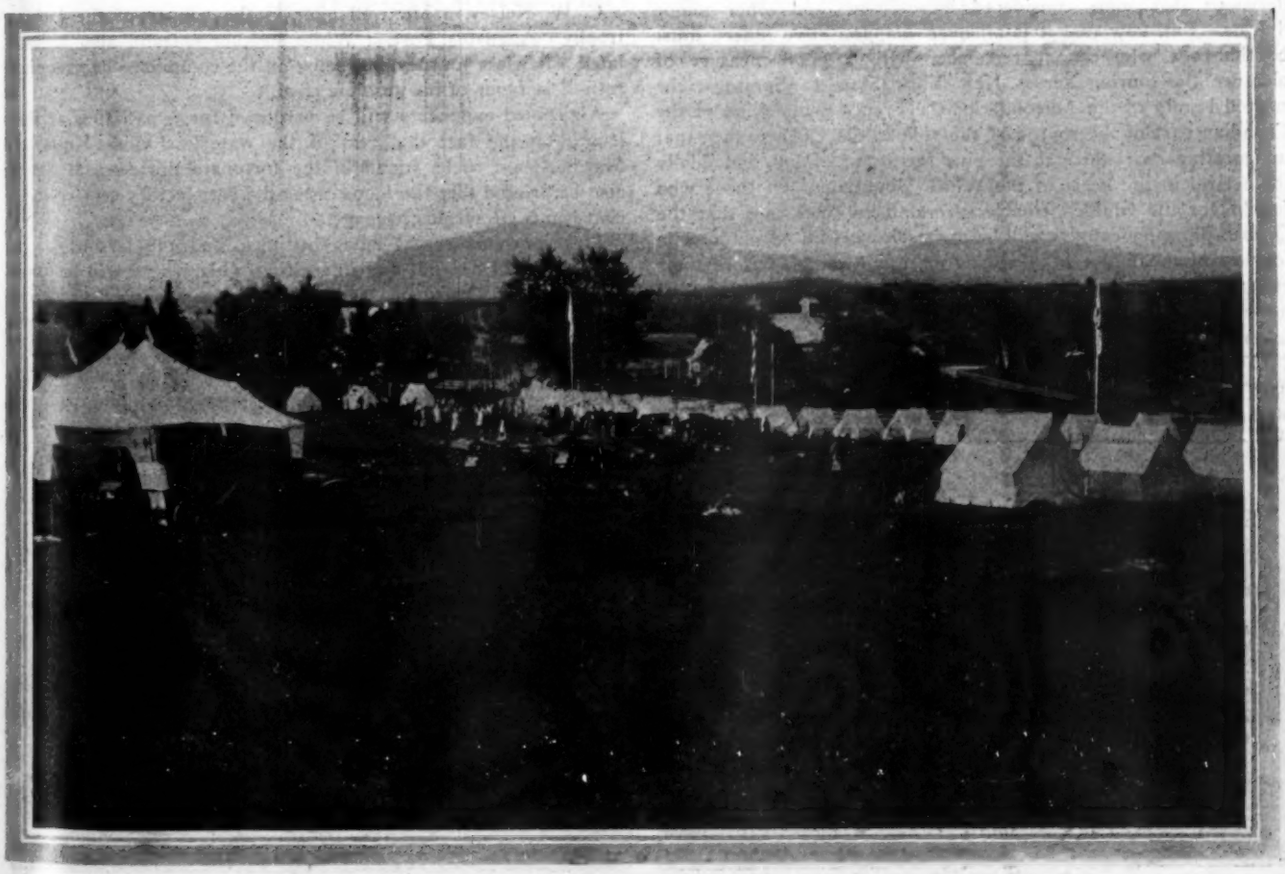
THIRTEEN TIED IN THE A. A. A. TOUR

Others Lose Few Points and the Big Event Unmistakably Tells of the Marked Advance of a Great Industry.

BY A. G. BATCHELDER.

BRETTON WOODS, N. H., July 30.—Thirteen automobilists traveled 1,150 miles, from Buffalo to this delightful spot in the White Mountains, met without error the exacting schedule of the Third Annual A. A. A. Tour, and completed the journey tied for the honor of winning the Charles J. Glidden Trophy. A dozen more sturdy vehicles received less than a score of discredit marks, and seven additional cars survived with more or less penalization. Thus 32 of the 52 that left the Lake Erie city on the morning of July 12 continued in the arduous struggle till its conclusion.

The mechanical attention which these cars received during the diversified trip was limited to roadside repairs the time of which



PICTURESQUE CAMP AT JACKMAN, WHERE TOURISTS PASSED FIRST NIGHT IN MAINE.

THERE WAS JUST ROOM FOR TWO IN A TENT.

BENJ. H. KNOWLES IN LOCOMOBILE AT WATERVILLE.

counted in the schedule. Abnormal conditions these were, for the man making a long tour gives careful heed each night to the automobile that transports him from point to point. That the showing was so highly creditable surprised and gratified the Touring Committee which thought a task had been supplied sufficient to test the capabilities of the staunchest motor-driven vehicle in existence.

Under circumstances somewhat modified—repairs being permitted at the stops en route—six other automobiles contended for the Paul Deming trophy, two coming through with unblemished records. In the auto cavalcade were also included the official cars as well as those the owners of which preferred to enjoy the tour as members of the unhampered pleasure division. Some joined and others dropped out of the running at various places, but an average of sixty cars daily streaked across the country.

True there were discomforts in the tour, stringent rules for the contestants, poor hotel accommodations at several places, official decisions that some considered inconsistent, and other minor defects. But, now that it is all over, inappreciative indeed must be that one who cannot remember with a good measure of pleasure the touring across New York State to Saratoga, the rugged beauty of the Adirondacks, the French complexion of the Canadian part of the route and the visit to old Quebec, then that invigorating swirl through the pine forests of Maine, and finally the arrival in the heart of the White Mountains. Of those who fought for the Glidden trophy several have since said that the Quebec-Rangeley country will be their selection for an automobile journey of the future in which no prize will dangle before their eyes and make enjoyment a meager quantity. All were astounded to find such excellent roads leading south from the city of the St. Lawrence.

The Automobile Club of Buffalo, of which Percy P. Pierce, the 1905 Glidden winner, is a member, will probably retain possession of the trophy for another year. This would seem to be the probable interpretation of the deed of gift by the Glidden Commission, which will hold a session in New York City very shortly. This commission now consists of John Farson, president of the A. A. A.; Dave Hennen Morris, president of the A. C. A.; W. K. Vanderbilt, Jr., representing the Automobile Club of France; G E. McQuesten, representing the Automobile Club of Germany, and Charles J. Glidden, the donor of the trophy. The commission delegated to the A. A. A. Touring Committee the entire right to arrange for this year's competition, but the commission retains the power to award the trophy. The deed states that the trophy shall remain in the custody of a club until it is won by the representative of another club. Thirteen tied leaves only one thing for the commission to do. Were it a question of manufacturer, the Pierce Company would have first claim because three of its cars are included in the lucky thirteen. Mr. Glidden has come forward with the generous announcement that he will give a silver medal to all the clean score finishers.

C. W. Kelsey, a Maxwell pilot, is the winner of the Deming trophy. Augustus Post, a White steamer entrant, also accumulated a flawless journey, but being on the committee he gracefully retired in favor of his gasoline rival.

Air-cooled exponents will be pardoned for expatiating at some length on the fact that two of the waterless kind—Knox and Marmon—are to be found in the fortunate thirteen. It should also be printed that the Knox truck did satisfactory service in the conveyance of surplus baggage.

Post mortems reveal much ofttimes, and the lessons of the 1906 tour will be vital and interesting. Elsewhere will be found a comment of Chairman Deming referring to the inability to combine smoothly a contest with a pleasure tour. Many will agree with the hard-working chairman on this point. Superintendent Tucker labored faithfully, and while he undoubtedly could improve upon much that he attempted, those who know him well will refuse to believe him guilty of any grafting proclivities.

LEAVING WATERVILLE FOR RANGELEY LAKES.

A WAYSIDE SALUTE BY THE AGRICULTURIST.

COMMENTS ON THE THIRD TOUR.

Chairman Paul Deming of the Touring Committee: "I do not believe that it is possible to combine a contest and a pleasure tour; it is like trying to mix oil and water. A contest requires rigid rules; in a pleasure tour the exact opposite is desirable. The A. A. A. might conduct a pleasure tour; for instance, next year to the Jamestown Exposition. But otherwise the organization might better expend its energies in the direction of laws, good roads and other similar matters for the general good of automobiling."

S. S. Gorham, Secretary of the A. A. A.: "In spite of some things that could have been improved upon, I consider the tour a grand success in that it has demonstrated the great advance in automobile construction and the ability of the car of to-day to go through a 1,100-mile journey with flying colors. There should be another A. A. A. tour next year, perhaps with the pleasure idea more in evidence."

Percy Pierce, the 1906 Winner: "With the exception of cleaning a dirty spark plug, I never touched a wrench to the Great Arrow during the entire tour, which, despite the varied roads, did not seem particularly trying to me. The hotel arrangements in some of the stopping places were faulty, but this could be remedied another year with no great difficulty."

F. R. Smith, president Olds Motor Works: "This tour has demonstrated the true work of the American automobile, which has met all sorts of conditions. I believe, however, that all cars which have lost perfect scores through tire troubles should be given equal credit with the perfect score contingent."

Tom Fetch, the transcontinentalist, whose Packard did prodigious duty in the work of the tour, said: "If the cars of 1903 had attempted such a tour as this one there would have been none left to check at Quebec."

Ezra E. Kirk, of the E. R. Thomas Motor Company: "It has been a strenuous tour, and while your uncle will be on the route next year it will be as a member of the pleasure division."

THE SCORE OF THE GREAT TOUR.

THIRTEEN THAT SURVIVED WITH PERFECT RECORDS TO THEIR CREDITS.

No.	Car	H. P.	Entrant	Club	Tire	Score
27	Pierce	40-45	Percy P. Pierce	A. C. Buffalo	Goodrich	0
28	Pierce	40-45	A. E. Hughes	R. I. A. C.	Goodrich	0
14	Pierce	28-32	P. S. Flinn	A. A. A., Pittsburg	Goodrich	0
15	Knox	35-40	W. E. Wright	Springfield A. C.	Diamond	0
11	Pope-Toledo	35-40	George Soules	A. A. A., Toledo	Goodrich	0
66	Marmon	30	Frank E. Wing	B. S. A. A.	Goodrich	0
9	Thomas	50	G. M. Davis	A. C. Buffalo	Goodrich	0
25	Columbia	24-28	C. F. Barrett	A. C. Hartford	Goodrich	0
3	Stearns	40-45	L. J. Petrie	Cleveland A. C.	Diamond	0
56	Peerless	45	Chas. Burnham	Cleveland A. C.	Diamond	0
12	Pope-Hartford	25	W. C. Walker	A. C. Hartford	Goodrich	0
51	Oldsmobile	28-30	Ernest Keeler	A. A. A., Lansing	Fisk	0
73	Packard	24	G. G. Buse	A. C. Buffalo	Goodrich	0

NINETEEN OTHERS THAT COMPLETED THE JOURNEY.

No.	Car	H. P.	Entrant.	Club	Tire	Score
8	Thomas	50	Ezra E. Kirk	A. C. Buffalo	Diamond	2
53	Cleveland	30-35	Dexter Fairbanks	Cleveland A. C.	M. & W.	2
67	White	18	H. K. Sheridan	Cleveland A. C.	Diamond	2
2	Stearns	40-45	Arthur Holden	Cleveland A. C.	Diamond	3
52	Oldsmobile	28-30	R. R. Owen	Cleveland A. C.	Diamond	4
70	Oldsmobile	28-30	Palmer Abbott	New Orleans A. C.	Fisk	5
50	Corbin	24	M. S. Hart	New Britain A. C.	Diamond	9
1	Apperson	40-45	N. H. Van Sicklen	Chicago A. C.	M. & W.	11
63	Elmore	35	J. H. Becker	A. A. A., Clyde, O.	Dunlop	11
62	Lozier	40	E. R. Lozier	N. Y. M. C.	Diamond	12
58	Darracq	40-60	S. B. Stevens	A. C. A.	Michelin	14
26	Packard	24	F. J. Pardee	Chicago A. C.	Diamond	15
5	Stoddard-Dayton	30-35	J. H. McDuffee	Chicago A. C.	M. & W.	45
59	Oldsmobile	28-30	John Banford	A. A. A., Lansing	Diamond	65
16	Stevens-Duryea	50	R. B. Craufurd	A. A. A., New York	Fisk	87
37	Peerless	30	C. G. Wridgway	A. C. A.	Diamond	136
41	Maxwell	16	J. C. Kirkham	A. A. A., New York	Ajax	154
60	Corbin	24	Phillip Corbin, Jr	New Britain A. C.	Diamond	303
23	Pope-Hartford	20-24	J. A. Mechaley	A. A. A., Stamford, Conn	Dunlop	480

TWENTY THAT HAD MORE OR LESS DIFFICULTY.

No.	Car	H. P.	Entrant	Club	Tire	Score	Retired, Day
36	Columbia	40-45	W. W. Burke	N. Y. M. C.	Diamond	3	2nd
61	Reo	16	T. P. C. Forbes	N. Y. M. C.	Goodyear	3	2nd
69	Locomobile	30-35	B. H. Knowles	A. A. A., Brooklyn	Diamond	99	2nd
74	Packard	24	Chas. Parvin	A. A. A., Peoria	Goodrich	135	2nd
38	Lozier	40	A. L. Rich	N. Y. M. C.	Gallois	208	2nd
57	Harrison	40	A. A. Russell	Grand Rapids A. C.	Diamond	793	2nd
55	Crawford	24-28	W. A. Danzer	Hagerstown A. C.	Goodyear	19	4th
21	Haynes	50	Elwood Haynes	Chicago A. C.	Diamond	36	5th
18	Packard	24	H. D. Newman	New Orleans A. C.	Diamond	340	5th
47	Peerless	30	J. L. Snow	B. S. A. A.	Goodrich		7th
65	Marmon	30	T. E. Schultz	N. Y. M. C.	G. & J.	36	7th
48	Cleveland	30-35	Jas. Laughlin, 3d	Berkshire A. C.	M. & W.	735	7th
29	Buick	30	H. E. Shiland	A. A. A., Jackson			6th
30	Buick	22	W. C. Durant	A. A. A., Jackson			6th
34	Gearless	50	J. W. Breyfogle	Rochester A. C.		70	6th
64	Buick	30-35	W. L. Marr	A. A. A., Jackson		40	6th
45	English Daimler	30	P. F. Moore	N. Y. M. C.	Gallois	79	6th
20	Clement	24-30	E. M. Wiley	A. A. A., New York	Michelin	1706	3d
10	White	18	Webb Jay	Chicago A. C.	Diamond		2nd
6	Knight	30-40	C. Y. Knight	I. S. A. A.	Continental		2nd

THE DEMING TROPHY CONTEST.

No.	Car	H. P.	Entrant	Club	Tire	Score
24	Maxwell	36	C. W. Kelsey	N. Y. M. C.	Ajax	0
31	White	18	Augustus Post*	A. C. A.	Goodrich	0
40	White	18	J. G. Cassatt	A. A. A., Philadelphia	Diamond	86
33	White	18	Watson Coleman	B. S. A. A.	Diamond	252
39	White	15	L. F. Braine	N. Y. M. C.	Jenatzy	733
43	Peerless	30	F. P. Peitsch	Chicago A. C.	Goodrich	3167

*Mr. Post, being a member of the Touring Committee, retired in favor of Mr. Kelsey, to whom the trophy was awarded.

LOOKING FROM RANGELEY LAKE HOTEL AT THE CARS LINED UP FOR THE STOPOVER AT THAT DELIGHTFUL MAINE RESORT.

MECHANICAL LESSONS OF THE TOUR

By E. L. FERGUSON.

Axles and springs; axles and springs,
When you check out their trouble begins.

MORNING after morning as each contestant came to the line for his starting time this paraphrase of a Mother Goose melody rang through my mind as each car waited for the allotted moment.

After the first few days it became second nature with me to note the general tone of each car as it moved into position, and always it was this: To the ear there was a rhythm of the motor which sounded good; the changing of gears in getting into position and away had only that soft clash which meant the gears themselves were normal and that their shafts ran true to work. But, when it came to the eye, observation showed repaired or replaced springs and axles, when they were tubular, buckled or without paint.

Let it be understood that the claim is not here made that this visual trouble was an inherent defect throughout. Nor, on the other hand, do I attribute it entirely to the road surface—or lack of surface would be better. Not at all. There were cases where these two were prime factors, but even then I look upon them as incidental rather than as conclusive. If I may venture so bold a hypothesis, the effects on axles and springs was due to deeper causes with these two as mere attributes in the whole.

JUDGE DILL ON HIS COTTAGE VERANDA AT RANGELEY.

It seems to me that the chiefest cause was the rush made for the next checking point that time might be gained, if needed, to make repairs, with tire troubles looming largest in the mind of each driver. In other words, the very act of providing for the need of spare time at checking points brought in that very need. With rare exceptions, the roads from Buffalo around to the northern line of Maine, were from poor to vile. Rushing over these at thirty-five and more miles an hour subjected the springs and axles to a pounding that only those in tonneaus can best appreciate.

When in a day's run a set of rear rubber buffers would be chopped to shreds—and it was not unusual for passengers to remark: "She struck bottom that time," as they fell back in their seats and the frame struck spring blocks or axles—it can be seen that a hundred of these shocks a day were abnormal and of necessity destructive. And there are few who won't bear out the estimate of 100 as reasonable.

Bearing all this in mind, can we wonder that a few axles and many springs were broken and that rear springs alone did not suffer because the lurch, and in many cases a literal leap of the car, brought the entire projective force on the front springs.

Coming back to the previous estimate of cause: trying to beat the schedule; and effect: using the time gained to repair running gear or tire, let us see if the reasoning is poor. No one will deny that the cars were badly hampered all through each day's run and for every day of the tour. Neither can it be denied that nothing is so destructive to metal as shocks, and that rhythm of shocks is the essence of all destruction. "But," guiltily reply the contestants, "I did that to have time for tire repairs." The reply is accepted as a plea, but let us see if we can call it a reason. Does it not occur to the thought that tires have a destructive point, and that this destruction can come from hammering, or, perhaps better, from distortion. If in a tire we had rubber and air as the

only factors to deal with, then distortion would be a negligible quality. But air is a free agent and rubber has no sustaining quality. It is the fabric that enters into the construction which is the factor of factors when tires are pounded, pulled, and even yanked over and through roads made up of of a series of gullies and holes.

Let me illustrate the point by the observation of two days, where the final run in for the night and the first control out for the following morning were over the same stretch of road. Going in I passed three cars, and knew of two others, that changed the front left shoe. Coming out I passed six cars and knew of one other, that changed the right front shoe. Coincident with this I noted that the road was full of chuck holes on the left side going in and obviously these were on our right coming out. The deduction, to my mind, is that under the pace the cars were driven over the road it was just a series of double pulling and twisting on the tires of the respective side, due first to the wheel banging into the hole and second to the counter effort at the steering wheel to offset the deviation from the straight-line steering of the driver.

Just as it was with tires, so it was with springs and axles, and in some few cases with steering mechanism; all are subjected not simply to the strains of service in carrying under normal conditions, but to a synthetic series that under the abnormal surroundings became as a square of their own defections.

The proof of this lies in this developed situation as the tour progressed in days. From numerous causes, but primarily from a realization that the grandeur of the Adirondacks and the quaintness of French-Canada was being lost—in addition to position vide points—there was from day to day a diminution of the contesting class and an augmentation of the touring class. What was the immediate result? Tire, axle, and spring trouble disappeared or became a negligible quantity with them, while those who hung to schedule towing (?) kept up if they did not increase the previous record.

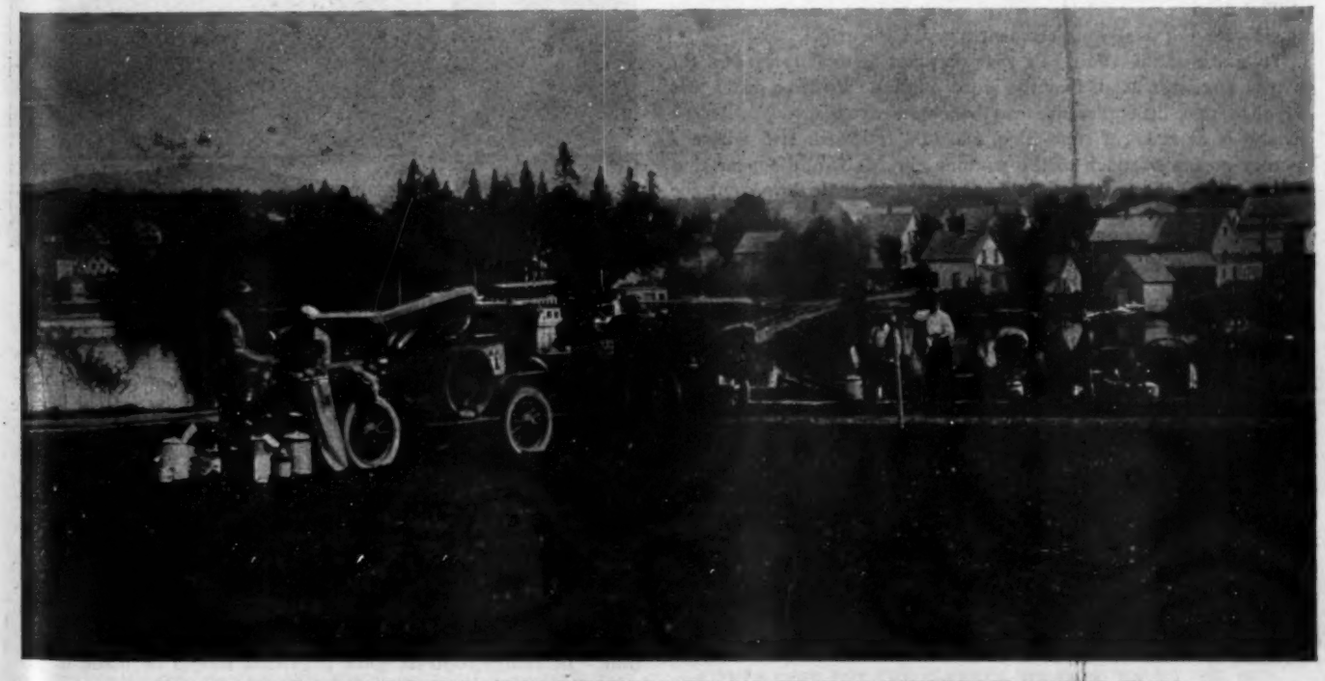
To speak of the power plant conditions would be a little more than a shot in the dark in the absence of definite examination, and while such examination might be a consummation devoutly to be wished, is anyone prepared to say that such an examination could be made that would be conclusive? I think not, as examinations go. The solution of this could only come from a providential knowledge of which cars were immediately sent to factories for overhauling and what that overhauling entailed.

CHARLES WRIDGWAY IN HIS PEERLESS IN THE MAINE WOODS.

Certain it is, that with few exceptions the cars to finish the tour ran with their power plants in good tune on the Sunday of their release.

More than that, few, if any, were hunting for freight cars to take them away, while it was notable that many started away on trips, reaching in some cases to a mileage at least one-half that of the tour just finished.

There is one point, that of engine cooling, that ought not to be overlooked; an especial point because there were at least four days when mountain, and not hill, climbing was continuous, and to this must be added the prevailing hot weather, with the roads



PREPARING FOR THE EARLY START FROM RANGELEY LAKES FOR THE FINAL DAY'S RUN TO BRETTON WOODS.

BLOCKADE OF CARS IN A MAINE HIGHWAY.

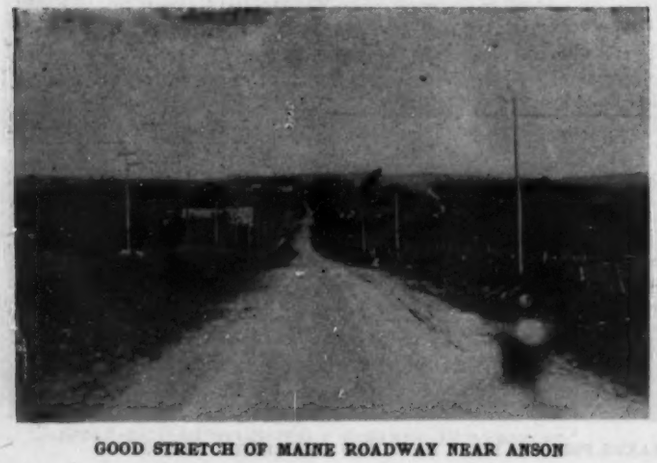
closed in by lofty trees, frequently making the rush the only relief for the passengers. In spite of this there seems to have been only two water-cooled cars that had to be nursed on account of insufficient circulation, and these were with newly designed engines. In each case the factory representative expressed himself as being delighted with his entry as the occasion had been one of immeasurable value in that he had found out what would perhaps have been otherwise never learned. In fact, the conditions of the entire tour brought forth many expressions along this line, as having taught valuable lessons on details, lessons which never could have been learned under any normal stress that occurs in general testing.

ONE OPINION OF THE TOUR.

By ALFRED REEVES.

That it was the most severe test to which automobiles were ever subjected and that the wonderful record supplied is a signal triumph for American cars, is generally admitted by those who participated in the third annual A. A. A. tour. Moreover, the affair taught manufacturers some important improvements that can be made in automobiles, besides inculcating in the minds of everyone the pleasures of touring and the crying needs of better roads, particularly in New York state and Canada. Last, but not least, the tour proved that a caravan of automobiles, piloted by skilled drivers, can safely carry passengers long distances at good speed—for not a serious accident marred the trip.

To speak of the affair as a tour may not be exactly proper, for it was a contest in all that the word implies. Positive proof was supplied that little pleasure can be obtained on a tour where a trophy is at stake, a time-table schedule followed, and where a victory means so much to the winning car. It would appear that a contest for the trophy must be severe enough to bring out the best car, and the pleasure part of the tour must be kept separate without rules other than those to prevent interference with competing machines. Another thing to satisfy contestants would be the placing of observers on cars; an observer to be furnished by each entrant and who shall ride on cars other than the one by which he is nominated and not more than once on any car.



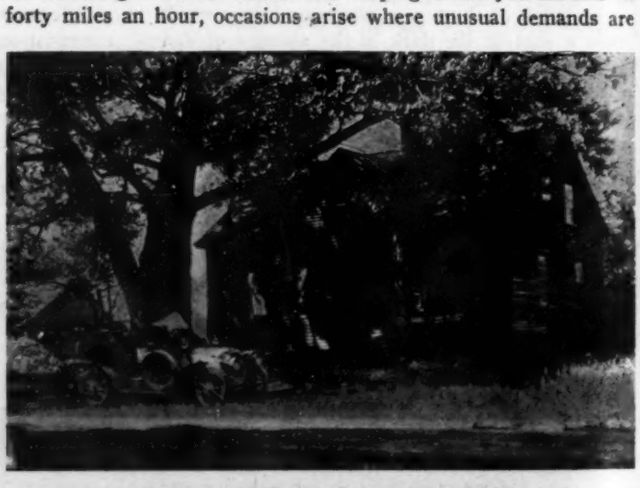
GOOD STRETCH OF MAINE ROADWAY NEAR ANSON

The impression prevailed at the end of the tour that American cars stood the gruelling test in grand fashion. Of engine troubles there were very few, and 90 per cent. of those who failed to make perfect scores were accounted for by tire troubles. Of more than passing notice was the work of air-cooled cars, a strictly American product. No motor of this type was reported as overheating, although there was plenty of low gear work, especially in the mountainous districts.

Observing manufacturers discovered many points in cars that will stand for improvement. Although automobiles are not made

NEAR THE CHECKING STATION AT STRATTON, ME.

for hurdling railroad tracks and leaping thank-you-ma'ams at forty miles an hour, occasions arise where unusual demands are



OCCASIONALLY A DESERTED FARMHOUSE WAS PASSED.

made, and cars must be built for them. The Glidden tour was an abnormal test of cars, but all tests must be abnormal or they are of little value. Generally speaking, the main troubles were with axles, broken springs, burnt out brakes and clutches. There were only a few instances of each, bent axles being the most in evidence and of course the most apparent. Cars prepared for the trip with shock absorbers were fortunate in having no broken springs, and the tour proved conclusively that some sort of a shock absorber is an essential part of touring equipment.

Tire troubles lost many points for contestants, else there might be more clean scores. Some of this resulted from trying to make speed over rough roads and on turns. Quick detachable rims played an important part in the contest and saved much valuable time. In future contests some provision should be made to prevent tire troubles scoring against the cars.

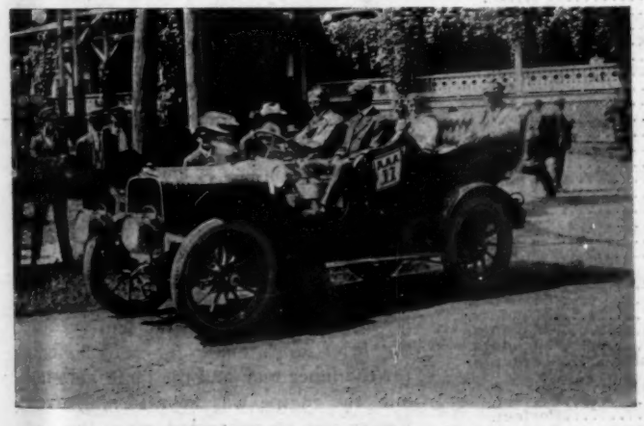
To the thirteen winning cars in the Glidden contest and to the drivers should be given praise of the highest order. Machines and men—and, incidentally, the passengers—withstood some rough treatment. The cars were three Pierces, a Stearns, Marmon, Packard, Knox, Thomas, Pope-Toledo, Pope-Hartford, Columbia, Oldsmobile, and a Peerless.

In the contest for the Deming trophy, a four-cylinder Maxwell on its debut trip, with C. W. Kelsey at the wheel, scored a victory. A. A. Post, with a White, was the only other contestant in the competition to make a clean score, but as he was a member of the touring committee he generously withdrew.

No great events are held without mistakes being made, and there were many in connection with the tour just completed. They were all made with the best intentions, however, although

GEORGE WILEY IN CLEMENT-BAYARD AT A CONTROL.

a few claimed otherwise. As the conduct of this year's tour was vastly superior to the one of 1905, so next year's, with the experience gained, should be par excellence.



GEORGE SOULES IN HIS POPE-TOLEDO.

THE GLIDDEN TOUR IS OVER.

By GEORGES DUPUY.

The rain, wet rain, which had been withholding itself for the last seventeen days, over the heads of the indefatigable motor excursionists, has just opened its celestial sluices and now long oblique, transparent needlefuls are tackling the close background. Under the sudden shower the harmonious hills clothed with pines of majestic grandeur are being tinted with deeper green, and so are the large, soft lawns that form the bottom of the enchanting valley. The Glidden tour is over; it is raining now, and I shall give this rain symbolic signification, for recriminations and protests are also falling with it. Nonsense! Is there not, in the whole caravan, a good philosopher automobilist who will agree with me, viewing this grand, wonderful scenery, that

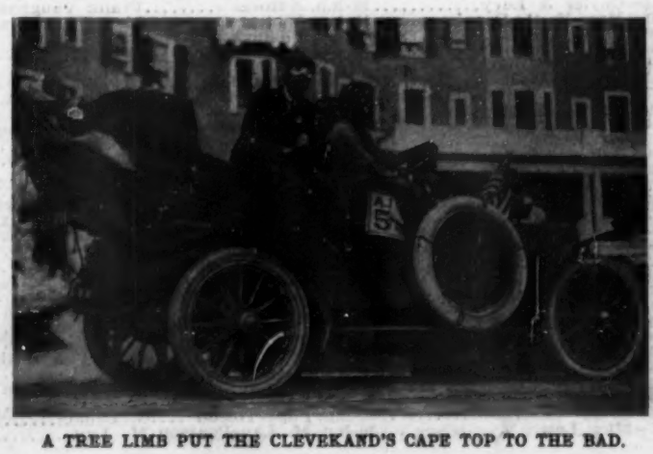
ONLY TWO MINUTES WERE LOST BY THIS MISHAP.

"Queen Automobile" is the great ruler of landscapes and distances, and that Mr. Glidden is all right?

Before examining what are the teachings of that long and hard competition to the American manufacturers, I wish I could, with humble but severe authority in the matter, extend my congratulations to the touring committee for its excellent work, despite some of the bitter and hastily expressed criticisms that have appeared in several papers on that subject. One will understand that it was not such an easy task to work out the details of a 1,200-mile tour, establish fair rules, and select at the same time the configuration of country where the 1906 American vehicles could show their much-advertised qualities to the extreme limit; it was no little job to "blaze the trail" for fifty eager cars carrying two hundred people; place unmistakable signs and cautions all along the route, provide accommodations where they were not to be had, advertise the event in the papers of all localities traversed for the best benefit of our industry, select splendid stopping points to compensate the discomfort of some bad ones, and all that with the best spirit of sportsmanship.

A very charming proof of the success of the A. A. A. tour this year was the happy gallantry of the ladies in general. When the tired boys were grumbling the girls were laughing. They were perfectly comfortable everywhere—in the jumps and ruts of the Adirondacks and under the white tents at Jackman. Dusty-faced, hastily eating a sandwich at the checking stations, their goggles removed, they always had a smile and a nice wave of the hand for the dirty but lucky checker as he sat before his table on the wayside. The ladies of the Glidden tour have pronounced the contest splendid, and that settles it.

To come within a point or two of capturing first honors and to lose that point or two by some trivial trouble is aggravating in the extreme; yet this is what happened a number of contestants in the Glidden tour, and prevented their making the much-sought-for perfect score.



A TREE LIMB PUT THE CLEVEKAND'S CAPE TOP TO THE BAD.

THIRTY-TWO CARS PERFECT IN CHICAGO RUN

CHICAGO, July 30.—Out of eighty-five entrants there were eighty-five starters, and but two of the number failed to cover the entire course, in the first reliability contest of the Chicago Automobile Trade's Association and the Chicago Automobile Club, held Thursday, July 26, over the Elgin-Aurora century course. Thirty-two machines made perfect scores. Of the two cars which failed to finish one was the lowest powered car ever sold here and the other had a breakage of the crankshaft.

But one class of the populace was disappointed—the constable body. These energetic individuals expected to reap a rich harvest along the route, and had set up a watch all along the road, but the slow pace set by the committee foiled them except in two cases. In the small village of Addison, Paul Henderson in an Oldsmobile and Joseph Gunther in a Rambler, fell victims to the constables and were allowed to proceed only after giving bonds for their appearance. Several contestants declare that the two men were driving at a very slow rate of speed. In fact, some of the cars had to drive very slowly to prevent their being at the control at Elgin ahead of time. On the return trip the contestants found themselves so far ahead of the schedule that they had to go slow again from Oak Park to the finish line on Michigan avenue. It was somewhat of a joke to see the police lined up along Washington avenue to arrest speedsters. They got the laugh. Some even went so far as to zig-zag along the street to kill time. There were big crowds waiting at various points along the route to see the machines pass.

The course was marked out with confetti, and so well was this work done that no difficulty was reported on this score. Because so many finished with perfect scores the committee has decided to give each winner a cup or medal of equal value.

It is interesting to note that out of three women drivers who piloted their cars over the course, two came through the perfect scores—Miss K. D. Swits, driving a 20-horsepower Autocar and Mrs. B. F. Draper, driving a White.

CLASS 1—FOR CARS LISTING AT $1,000 AND UNDER:

No. and Entrant.	Make.	Driver.	Score.
68—Holsman Auto Co.	10-h.p. Holsman	V. Bendix	Perfect.
76—Maxwell-Briscoe-Chase Co.	10-h.p. Maxwell	W. B. Jamieson	Perfect.
77—Maxwell-Briscoe-Chase Co.	10-h.p. Speedster	G. W. Price	Perfect.
85—J. R. Bensley	10-h.p. Maxwell	J. R. Bensley	2 points.
69—Holsman Auto Co.	10-h.p. Holsman	W. Hildreth	24 points.
10—Ford Motor Co.	19-h.p. Ford	T. J. Hay	30 points.
15—Ralph Temple Auto Co.	8-h.p. Reo	A. J. Nicolet	69 points.
16—Geyler & Levy	12-h.p. Autocar	L. Geyler	70 points.
82—R. Belle	10-h.p. Cadillac	R. Bolle	151 points.
2—Mrs. C. H. Foster	10-h.p. Cadillac	G. Farnsworth	165 points.
83—S. E. Gillard	10-h.p. Cadillac	S. E. Gillard	205 points.
39—Orient Motor Car Co.	4-h.p. Buckboard	J. H. Toole	Did not finish.

CLASS 2—FOR CARS LISTING OVER $1,000 AND NOT EXCEEDING $1,750:

35—Hagmann & Hammerly	20-h.p. Jackson	C. E. Hammerly	Perfect.
49—Buick Motor Car Co.	20-h.p. Buick	E. L. Weiant	Perfect.
60—Ralph Temple Auto Co.	16-h.p. Reo	R. M. Owen	Perfect.
70—W. C. Tennant	20-h.p. Northern	W. J. Boone	Perfect.
84—G. E. Holmes	16-h.p. Maxwell	G. E. Holmes	Perfect.
25—C. S. Neuman	20-h.p. Rambler	P. Soderstrom	15 points.
53—Axel Levedahl	18-h.p. Rambler	A. Levedahl	30 points.
55—Wright Elsom	18-h.p. Rambler	W. Elsom	30 points.
81—F. L. Taylor	16-h.p. Reo	F. L. Taylor	38 points.
12—T. B. Jeffrey & Co.	20-h.p. Rambler	L. Hodgson	50 points.
9—J. F. Guenther	16-h.p. Rambler	J. F. Guenther	60 points.
28—Frank Wentworth	25-h.p. Rambler	E. Maraz	115 points.
21—H. J. Bonney	25-h.p. Rambler	C. Nelson	135 points.
32—Hagemann & Hammerly	20-h.p. Cartercar	J. Hemwald	145 points.

CLASS 3—FOR CARS LISTING BETWEEN $1,750 AND $2,500:

20—C. H. Horrie	25-h.p. Pope-Hartford	Eugene Kelly	Perfect.
22—Ralph Temple Auto Co.	25-h.p. Premier	H. Hammond	Perfect.
36—W. A. Akers	40-h.p. Stevens Duryea	Harry Jones	Perfect.
40—Hamilton Auto Co.	35-h.p. Elmore	G. Thurber	Perfect.
48—Branstetter Motor Co.	28-h.p. Queen	C. A. Englebeck	Perfect.
51—Mitchell Auto Co.	24-h.p. Mitchell	C. H. Betts	Perfect.
56—L. P. Halladay	28-h.p. Halladay	L. P. Halladay	Perfect.
78—Wood Beal	30-h.p. Stoddard-Dayton	R. W. Leach	Perfect.
26—Haynes Auto Co.	30-h.p. Haynes	Frank Nutt	1 point.
29—Ralph Temple Auto Co.	20-h.p. Premier	W. T. Brown	3 points.
17—Winton Motor Carriage Co.	30-h.p. Winton	A. D. Shanks	4 points.
45—Electric Vehicle Co.	18-h.p. Columbia	J. Hertz	10 points.
71—C. A. H. Burras	20-h.p. Autocar	G. A. R. Burres	10 points.
72—R. W. Tansill	15-h.p. White	R. W. Tansill	11 points.
37—C. Haws	40-h.p. Rambler	C. Haws	12 points.
88—Githens Bros. Co.	28-h.p. Oldsmobile	A. Johnson	16 points.
38—Mitchell Auto Co.	25-h.p. Mitchell	F. Hirsch	25 points.
14—Ford Motor Co.	40-h.p. Ford	J. B. Hedges	25 points.
27—Ralph Temple Auto Co.	21-h.p. Premier	Cliff Smith	25 points.
18—Frank C. Riggs	35-h.p. Rambler	F. C. Riggs	25 points.
8—Githens, Bros. Co.	28-h.p. Oldsmobile	Paul Henderson	30 points.
57—C. P. Warner & Co.	30-h.p. Moline	W. H. Endicott	34 points.
3—C. H. Foster	30-h.p. Cadillac	C. H. Foster	41 points.
63—Bennett-Bird Co.	28-h.p. Dolson	G. M. Bird	38 points.
23—R. M. Baker	24-h.p. Aerocar	H. R. Baker	50 points.
30—Mrs. L. T. Roenitz	18-h.p. White	Mrs. L. T. Roenitz	77 points.

CLASS 4—$2,500 AND UPWARDS:

4—George A. Crane	35-h.p. Knox	G. A. Crane	Perfect.
11—Geyler & Levy	28-h.p. Autocar	Frank Vaughan	Perfect.
31—Mrs. F. B. Draper	18-h.p. White	Mrs. F. B. Draper	Perfect.
33—C. A. Coey	50-h.p. Thomas	C. A. Coey	Perfect.
34—E. Q. Cordner	30-h.p. Ranier	E. Q. Cordner	Perfect.
41—S. M. Crowen	45-h.p. Dolson	A. G. Bennett	Perfect.
44—Electric Vehicle Co.	24-h.p. Columbia	R. Herrington	Perfect.
47—Electric Vehicle Co.	40-h.p. Columbia	H. G. Cairns	Perfect.
50—Dexter Fairbank	30-h.p. Cleveland	D. Fairbank	Perfect.
54—W. B. Grammer	50-h.p. Thomas	W. B. Grammer	Perfect.
61—M. A. Meade	35-h.p. Pope-Toledo	R. A. Meade	Perfect.
64—Ralph Temple Auto Co.	35-h.p. National	T. A. Kincade	Perfect.
65—Andrew Ott	50-h.p. Thomas	C. Bentham	Perfect.
67—F. L. Dyer	15-h.p. Locomobile	J. Marsh	Perfect.
73—Miss K. D. Swits	20-h.p. Autocar	Miss K. D. Swits	Perfect.
87—John Loves	40-h.p. Stearns	Jay Devereaux	Perfect.
46—Buick Motor Car Co.	30-h.p. Buick	M. Case	2 points.
52—A. S. Aldrich	40-h.p. Pierce	A. Monsen	4 points.
42—Martin Beck	40-h.p. Pierce	M. Beck	8 points.
59—Locomobile Co.	30-h.p. Locomobile	A. J. Banta	10 points.
6—H. Paulman & Co.	45-h.p. Pierce	P. Hoffmann	10 points.
74—Mrs. M. Stolton	18-h.p. White	B. P. McAlees	13 points.
5—J. E. Plew	18-h.p. White	J. E. Plew	25 points.
79—C. Y. Knight	35-h.p. Silent Knight	C. Y. Knight	30 points.
13—N. H. Van Sicklen	40-h.p. Apperson	N. H. Van Sicklen, Jr.	30 points.
19—Ralph Temple Auto Co.	40-h.p. National	Ralph Temple	41 points.
43—Hamilton Auto Co.	30-h.p. S. & M. Simplex	B. C. Hamilton	66 points.
62—Ralph Temple Auto Co.	50-h.p. National	W. F. Clemens	67 points.
86—O. F. Weber Co.	35-h.p. Pope-Toledo	G. Lemon	72 points.
75—Max Lau	30-h.p. M. Lau-Pearson	M. Lau	133 points.

A NON-STOP RUN.

Not satisfied with having made a perfect score in the Glidden Tour, Ernest Keeler, who drove the Oldsmobile 28-horsepower touring car, No. 51, took a night's rest after the tour finished at Bretton Woods on Saturday, and on Sunday set out for New York. The run was made in 26 hours 18 minutes, and neither motor nor man rested during the entire journey—the motor ran continuously from start to finish without a stop or adjustment, and Keeler sat at the wheel for the entire trip. For eight long, dreary hours the rain fell steadily, but the car was pushed on, and even at the brief stops made for refreshments for the inner man and the inner automobile, the engine was kept turning over. Keeler was so exhausted when the end of the journey was reached that he instantly fell asleep, and his passengers were almost equally used up.

In the car with Keeler were H. J. de Bear, the A. A. A. official observer, Henry Clinton and D. L. Graves, all of whom were nearly as tired as plucky little Keeler. All testified that the motor had run without stopping since it was started at Bretton Woods just before setitng out for the home flight and had run smoothly and well.

Keeler is the driver who will handle the six-cylinder 110-horsepower Oldsmobile racing machine in the Vanderbilt Cup elimination trials in September.

RACING AND TOURING AT OSTEND.

OSTEND, July 19.—The breezy Belgian seaside resort is at the height of its brilliant season, and is offering such an array of boating, tennis, polo, automobiling, and other sports that the routine of city life has been annihilated. The automobile week opened in brilliant weather on July 13 with the weighing-in operations and an elegance competition, when Baron T'Serclaes won first prize in the closed car class, with a Panhard limousine, with body work by the Parisian firm of Audineau & Cie. Only one prize was awarded in the open-car class, being carried off by M. Fraignac, with a double phaeton Cottin-Desgouttes, with body work by Leon Faurax, of Lyon.

On Saturday the scene changed and all were panting for speed. A gentle rain in the early morning had settled the dust, and when the motorcycles were sent away just before 10 o'clock, with a breeze astern, conditions were perfect. Peugeot and Darracq had the running all to themselves, in the different classes, Mr. Guinness, the British owner of Hemery's eight-cylinder flyer of Florida fame, attaining the highest speed, the official results being as follows for the kilometer, flying start (racers):

MOTORCYCLES (MORE THAN 110 POUNDS).

	Time.	At rate of
1. Giuppone (Peugeot)	:25 4-5	86.5 miles an hour
2. Cissac (Peugeot)	:26 2-5	84.7 miles an hour

MOTORCYCLES (LESS THAN 110 POUNDS).

1. Cissac (Peugeot)	:26 3-5	84.07 miles an hour
2. Giuppone (Peugeot)	:28 1-5	79.2 miles an hour

LIGHT CAR CLASS (LESS THAN 1,430 POUNDS).

Huntley Walker (Darracq)	26 2-5	84.7 miles an hour

HEAVY CAR CLASS (NOT EXCEEDING 2,200 POUNDS).

Lee Guinness (Darracq	:19	117.7 miles an hour

Hemery's record with this eight-cylinder racer was :20 3-5. The Englishman has thus gained 1 3-5 seconds on the Frenchman's time for the kilometer. When Hemery made his attempt on the Arles-Salon road climatic conditions were not so favorable as at Ostend, a cold headwind making running difficult.

In the afternoon the mile standing start was disputed, when Giuppone with a light Peugeot registered :56 2-5, and with a heavy motorcycle of the same make showed but 1:00 2-5. His companion, Cissac, also on a heavy Peugeot, covered the mile in 1:58. Huntley Walker, with his light Darracq racing car, had 1:35 1-5 as his time; A. Lee Guinness romped over the mile course with his heavy Mercedes racer in :45 2-5, making the fastest time of the afternoon.

America had an inning in the tourist class, M. Evenepoel's Pope-Toledo covering the flying kilometer in 1:11 1-5, or an average speed of 31.5 miles an hour, but lost first place to a Sizaire & Naudin, which had fifteen seconds better time. In the mile standing run the American was again robbed of first place by the French car, times being:

Van Cayzelle (Sizaire & Naudin)	1:45 2-5
Evanpoel (Pope-Toledo)	1:56

In the five kilometers standing start Darracq again had all the honors, for Mr. Lee Guinness ran his eight-cylinder over the course in 2:06 415 seconds, or at an average speed of 86.9 miles an hour. Lavergne on a Mors racer had to be content with second place for 2:24 3-5 seconds. Prince de Caraman Chimay, who had run out from Paris only two days previously with his newly-acquired six-cylinder Napier, was, unfortunately, unable to make a start.

Darracq had a further victory in the 1,430-pound racer class, when Huntley Walker's machine covered the mile in 3:30 4-5 seconds. In the light motorcycle class it was Giuppone on his Peugeot, who proved to be the swiftest, in 3:02.

Seven categories of tourists ran over the five kilometers course, M. Evenepoel's Pope-Toledo being matched against a Sizaire & Naudin in the less than $1,400 class, and securing second position with 5:25 2-5, compared with 4:44 2-5, for its French rival.

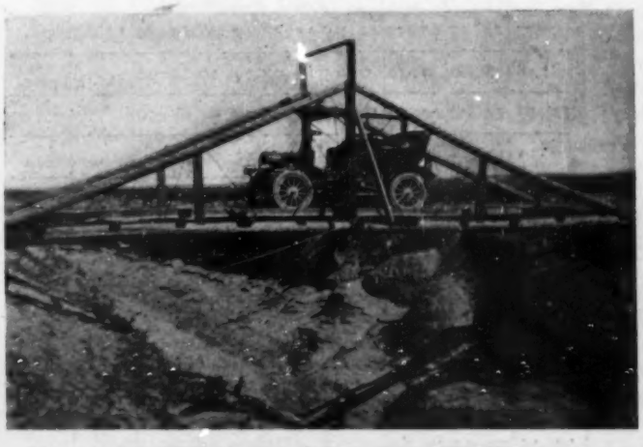
The closing event of the meeting was a run for tourists round the Littoral circuit, with Ostend as starting and finishing point. Twenty-seven cars started in seven different classes, according to selling price. The winners in the different classes were Sizaire & Naudin, Germain, Minerva, Radia, Cottin-Desgouttes, Metallurgique, Mercedes. A Pope-Toledo started in the $1,400 selling class, but had a spill while taking a difficult turn and was unable to finish. One of the fastest times of the day was done by a Pipe—a Belgian car—which covered the measured kilometer at an average speed of 67.3 miles an hour. Later an attempt was made to lower this record, when the Belgian covered the kilometer in :29 1-5, or at an average of 76 miles an hour.

A NOVEL BRIDGE FOR AUTOS.

An automobile bridge, the first of its kind as far as is known, has been erected by the Roswell-Torrance Mail and Passenger Stage line, in New Mexico, to span the Macho, a creek on the route. The bridge was so constructed as to prevent the passage of cattle, and was built without supports in the bed of the stream because of the heavy freshets. And the item of expense was also a matter of importance. The bridge shown in the accompanying illustration shows very clearly how the problem was solved. There is no floor, so that cattle can get no footing; the automobiles cross on the low-railed tracks on either side, a track for the wheels on each side of the car. The bridge has a total length of 64 feet. After becoming accustomed to the peculiar bridge, the drivers of the cars found it an easy matter to cross at full speed, to the consternation of nervous passengers. The bridge has been entirely satisfactory in every way. J. W. Stockard, manager of the automobile transportation company, designed the structure.

END VIEW OF AUTO BRIDGE.

Bridges of this type will doubtless become necessary in many other districts as automobiles push forward; the idea is one that can easily be adopted by others. The bridge is economical to build, and where there are no horse-drawn vehicles to use it, or where, as in this case, it is desirable to keep cattle from crossing, this design would be hard to improve upon.



LOOKING AT THE BRIDGE FROM THE SIDE.

REFERENCE TABLES FOR MOTOR HORSEPOWER

IT is often convenient to have a ready reference table by the aid of which an immediate approximation to the horsepower of a motor can be made when the bore and stroke are known. Such a table has been prepared by Worby Beaumont, the well-known English engineer, who gave permission to the editor of *The Automobile Club Journal* in London to publish it, and we here reproduce it. One table gives the ratings of engines with the cylinder dimensions in inches and fractions, and the other table gives the results with cylinders built to metric measurements. Of course in a table of this sort an arbitrary set of conditions as to revolutions,

Horsepower Table I.—Cylinder Dimensions in Inches and Fractions.

Bore	0	1/4	1/2	3/4	1	1/4	1/2	3/4	2
in. 2	0.54	0.60	0.67	0.74	0.81	0.88	0.94	1.01	1.08
	0.72	*0.80*	*0.89*	*0.98*	*1.08*	*1.17*	*1.25*	*1.35*	*1.44*
2 1/4	0.76	0.84	0.92	1.01	1.09	1.18	1.26	1.35	1.43
	1.01	*1.12*	*1.22*	*1.34*	*1.45*	*1.57*	*1.68*	*1.81*	*1.90*
2 1/2	1.04	1.15	1.25	1.35	1.46	1.56	1.67	1.77	1.88
	1.39	*1.53*	*1.67*	*1.81*	*1.95*	*2.09*	*2.23*	*2.37*	*2.51*
2 3/4	1.39	1.51	1.64	1.77	1.89	2.02	2.14	2.27	2.40
	1.85	*2.02*	*2.19*	*2.36*	*2.53*	*2.70*	*2.87*	*3.04*	*3.20*
3	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	3.00
	2.40	*2.60*	*2.80*	*3.00*	*3.21*	*3.40*	*3.61*	*3.81*	*4.00*
3 1/4	2.30	2.47	2.65	2.82	3.00	3.18	3.36	3.53	3.70
	3.06	*3.28*	*3.52*	*3.76*	*3.99*	*4.22*	*4.45*	*4.70*	*4.92*
3 1/2	2.86	3.06	3.27	3.48	3.68	3.88	4.09	4.30	4.50
	3.81	*4.09*	*4.36*	*4.63*	*4.90*	*5.18*	*5.45*	*5.72*	*6.00*
3 3/4	3.53	3.76	4.00	4.35	4.47	4.71	4.95	5.18	5.41
	4.71	*5.02*	*5.34*	*5.65*	*5.97*	*6.28*	*6.60*	*6.91*	*7.23*
4	4.27	4.65	4.81	5.08	5.35	5.61	5.89	6.15	6.41
	5.71	*6.06*	*6.42*	*6.78*	*7.13*	*7.50*	*7.85*	*8.20*	*8.55*
4 1/4	5.13	5.44	5.74	6.04	6.34	6.64	6.95	7.25	7.55
	6.84	*7.24*	*7.64*	*8.05*	*8.45*	*8.85*	*9.25*	*9.66*	*10.06*
4 1/2	6.19	6.53	6.87	7.22	7.56	7.90	8.25	8.59	8.93
	8.25	*8.68*	*9.16*	*9.62*	*10.08*	*10.54*	*10.96*	*11.41*	*11.89*
4 3/4	7.18	7.55	7.94	8.31	8.70	9.07	9.45	9.82	...
	9.57	*10.07*	*10.57*	*11.09*	*11.58*	*12.08*	*12.59*	*13.09*	...
5	8.38	8.80	9.22	9.65	10.05	10.46	10.90	...	...
	11.16	*11.72*	*12.28*	*12.84*	*13.40*	*13.95*	*14.50*	...	...
5 1/4	9.70	10.16	10.62	11.09	11.54	12.00	...	...	...
	12.02	*13.54*	*14.15*	*14.76*	*15.40*	*16.00*	...	...	...
5 1/2	11.12	11.65	12.15	12.66	13.15	...	...	...	...
	14.84	*15.51*	*16.20*	*16.86*	*17.54*	...	...	...	...
5 3/4	12.71	13.27	13.82	14.38	...	...	...	...	...
	16.06	*17.70*	*18.42*	*19.10*	...	...	...	...	...
6	14.45	15.05	15.65	...	...	...	...	...	...
	19.25	*20.05*	*20.85*	...	...	...	...	...	...

Horsepower Table II.—Cylinder Dimensions in Millimeters (Metric System).

Bore	0	5	10	15	20	25	30	35	40
in. 70	1.40	1.50	1.59	1.69	1.80	1.89	1.99	2.10	2.20
	1.87	*2.00*	*2.13*	*2.26*	*2.40*	*2.53*	*2.66*	*2.80*	*2.94*
75	1.72	1.84	1.95	2.07	2.18	2.29	2.41	2.53	2.64
	2.30	*2.45*	*2.60*	*2.76*	*2.91*	*3.06*	*3.22*	*3.37*	*3.52*
80	2.09	2.23	2.35	2.49	2.62	2.76	2.88	3.02	3.14
	2.79	*2.97*	*3.14*	*3.32*	*3.49*	*3.67*	*3.84*	*4.02*	*4.19*
85	2.43	2.65	2.80	2.95	3.09	3.24	3.39	3.54	3.69
	3.34	*3.54*	*3.73*	*3.93*	*4.12*	*4.32*	*4.52*	*4.72*	*4.91*
90	2.97	3.14	3.30	3.46	3.64	3.80	3.96	4.13	4.30
	3.96	*4.18*	*4.40*	*4.62*	*4.85*	*5.06*	*5.28*	*5.50*	*5.72*
95	3.50	3.68	3.87	4.05	4.24	4.42	4.61	4.80	4.98
	4.67	*4.91*	*5.16*	*5.40*	*5.65*	*5.90*	*6.15*	*6.40*	*6.64*
100	4.09	4.29	4.49	4.70	4.90	5.11	5.30	5.51	5.72
	5.45	*5.71*	*5.99*	*6.26*	*6.53*	*6.81*	*7.07*	*7.35*	*7.62*
105	4.73	4.95	5.17	5.40	5.63	5.85	6.08	6.30	6.53
	6.30	*6.60*	*6.90*	*7.20*	*7.50*	*7.80*	*8.10*	*8.40*	*8.70*
110	5.43	5.69	5.93	6.19	6.44	6.68	6.96	7.16	7.42
	7.23	*7.58*	*7.90*	*8.25*	*8.57*	*8.90*	*9.23*	*9.55*	*9.90*
115	6.22	6.48	6.77	7.03	7.30	7.56	7.85	8.11	8.37
	8.30	*8.65*	*9.02*	*9.38*	*9.74*	*10.01*	*10.46*	*10.81*	*11.18*
120	7.07	7.37	7.66	7.96	8.25	8.53	8.84	9.13	9.41
	9.42	*9.82*	*10.21*	*10.61*	*11.00*	*11.39*	*11.79*	*12.18*	*12.57*
125	7.97	8.30	8.63	8.94	9.25	9.57	9.89	10.21	10.54
	10.64	*11.06*	*11.50*	*11.91*	*12.34*	*12.76*	*13.20*	*13.61*	*14.04*
130	8.95	9.30	9.65	9.99	10.34	10.70	11.01	11.38	...
	11.94	*12.40*	*12.86*	*13.31*	*13.79*	*14.25*	*14.70*	*15.16*	...
135	10.08	10.44	10.80	11.18	11.56	11.92	12.30	...	...
	13.41	*13.91*	*14.40*	*14.90*	*15.41*	*15.90*	*16.40*	...	...
140	11.22	11.65	12.04	12.44	12.84	13.25	...	...	...
	14.99	*15.51*	*16.05*	*16.60*	*17.12*	*17.68*	...	...	...
145	12.52	12.98	13.41	13.82	14.25	...	...	...	...
	16.70	*17.30*	*17.88*	*18.42*	*19.00*	...	...	...	...
150	13.81	14.26	14.72	15.40	...	...	...	...	...
	18.41	*19.01*	*19.64*	*20.23*	...	...	...	...	...

mean effective pressure and mechanical efficiency have to be assumed; those employed represent average practice and the table is not offered as a substitute for experimentation when the most accurate results are desired.

It will be noted from Table I that in a very small space the estimated indicated power of engines with bore and stroke dimensions varying from 2-in bore and 2-in. stroke to 6-in. bore and 6 1-2-in. stroke is given. Similarly, in Table II, a similar series is given in metric measurement, covering sizes from 70 mm. bore and 70 mm. stroke to 150 mm. bore and 165 mm. stroke. In Table I there is a quarter of an inch difference of size of bore and stroke measurements between any two powers given, and in Table II a difference of 5 mm. In explanation of the tables, it will be seen that in column 1 the bore or cylinder diameter of the engine may be found, and in the columns to the right of this, commencing with the column headed 0, the power of the engine having that cylinder diameter and a stroke of the same dimension. Columns 3 to 10 in each table give the powers of engines of, for instance, the same bore, but having a stroke greater than the bore by the amount stated at the top of the column. For example, referring to table I, an engine having a cylinder 4 inches in diameter and a stroke of 4 inches would develop under conditions to be stated 4.27 i.h.p., as shown in the column headed 0, that is, column 2. If, however, the engine has a cylinder bore of 4 inches and a stroke of 5 1-2 inches, then the power developed is as shown in column 8, 5.89 i.h.p.

Similarly, for example, referring to Table II, an engine having a bore and stroke of 100 mm. would give 4.09 i.h.p., and an engine with a cylinder 100 mm. diameter and 140 mm. stroke would give 5.72 i.h.p.

It will be observed that to each bore dimension in column 1 two horizontal lines are given. The first of these gives the calculated power at a speed of 750 revolutions per minute, and the second the power at 1,000 revolutions per minute. The figures for the higher speed are printed in italic type. To make this clear, an example from Table I will suffice. For instance, the engine already referred to as having bore and stroke dimensions of 4 inches develops, at 750 revolutions per minute, 4.27 i.h.p., and as shown by the lower line, or at 1,000 revolutions per minute, 5.71 i.h.p.

The usual formula for calculating horsepower has been used, namely:

$$\frac{P\ L\ A\ N}{33{,}000 \times 2}$$

when P = mean effective pressure of 90 lb. per square inch,
L = stroke of engine in feet,
A = area of piston,
N = revolutions per minute.

The powers given in the tables represent the calculated indicated power given by one cylinder, and when multi-cylinder engines are being considered, the power shown by the table must be multiplied by the number of cylinders to give the total power.

To determine the useful power or brake horsepower, the mechanical efficiency of the engine has to be considered. No general rule can be given for this, and it may vary from a little less than 80 per cent. of the indicated power to as much as 88 per cent. For the majority of four-cylinder engines of good design and in good condition, run at speeds not unsuited to their design, and for powers of not less than 20 b.h.p., the efficiency may be considered to be 85 per cent. within reasonably close limits of accuracy. This figure is, however, merely suggestive, and it is necessary to be familiar with engine design and performances to correctly estimate the brake horsepower from the estimated indicated power of these small high-speed engines.

Very frequently an approximation to the calculated indicated power, or power developed in the cylinders, is all that is required to be known, and this may be taken direct from the tables, for the two named speeds, *i.e.*, 750 or 1,000 revolutions per minute. For other speeds the difference may be taken as arithmetically proportionate through a limited range, according to the type and design of the engine.

THE MANAGEMENT OF BRAKES.

Unsympathetic brake manipulation is one of the crying evils of the time, writes Henry Sturmey in the English *Motor*. You can stop a man quickly enough if you drop a bar across his feet. He will come over in a heap and stop very quickly; and so you can stop a car pretty quickly by jamming all brakes on as hard as you can at once, but it isn't any more good for the car than it is for the man. And "doing stunts"—as the Americans say—of this character doesn't show either your cleverness or the ability of your car in any way, but just the opposite, especially as regards the former. To stop a car suddenly on the brakes not only means excessive wear upon the brake surfaces—which will require renewal all the quicker—but an excessive strain upon brake communication and upon all parts in connection therewith. In the first place the sudden strain imposed by the friction of the brake band or blocks upon the drums is resisted by the fulcrum of the brake; that is to say, the point or joint by which it is attached to the frame of the car, and the pulling, twisting stresses upon this bolt and its connections, and upon the part of the frame to which it is attached, as well as upon the brake band itself, are something enormous. Just figure the thing out for yourself by following the action mentally, and doing a little simple reasoning, and, if you once grasp the situation, I am quite sure you will discontinue such unfair treatment. Stopping by the brakes means this: that stopping can only be secured by a reactional friction against the ground surface. So long as the car is being stopped gently by brake application this is not excessive, although the tire is being pulled at by the ground pretty heavily all the time; but if the brakes are applied so powerfully that even against the heavy pull of the ground friction the wheels are not permitted to revolve at all, then they simply scrape along the ground. To see what this means, just run along fast and then drop down on your hands and bring yourself to rest by the friction of the palms of your hands along the road surface! I guarantee you don't do it twice, and you will soon see what sort of thing is happening to your unfortunate tires, which are made of material approximately as delicate as that of your own hands.

"A merciful man is merciful to his beast," whether that "beast" be a real or a mechanical one, and, unless a man can cultivate and acquire this sympathetic feeling between himself and his car, he will never make a good driver, for the very essential of good driving is consideration for the car and the saving of it to the utmost, while at the same time getting the best results out out of it, and not, as some men seem to imagine, the ability to get through "tight places" and incur hair-raising risks and just come out unhurt.

Some cars require grease to be injected into most inaccessible places. We have in mind a machine which takes grease for its differential and for its two-to-one gear through holes of one inch in diameter, these holes being covered with screw plugs. Now, to push sufficient grease through these small orifices is a dirty and almost interminable task. We overcame the difficulty by pressing into service an old grease lubricator of the screw-down type. This lubricator was a gun metal pot about four inches wide and as many deep. In the screw lid there is a piston with a screw handle, so that when the pot is filled with grease it can be forced out by turning the handle round. At the bottom of the pot there is a piece of copper tube eight or ten inches long, so there is nothing easier than to insert this tube into the holes and then to screw down the lubricator, thus emptying its contents into the gear box. It may be interesting to add that we have found the easiest way to handle grease, when one is filling the pot or putting a considerable quantity into the change-speed gear box, is to use a small garden trowel kept specially for the purpose, and entirely free from grit. This is a very clean and quick method of dealing with five or six pounds of grease, and infinitely more satisfactory than the ordinary way of picking up small pieces on the end of a flat piece of wood, or digging one's hands into the mess and throwing it handful by handful into the box.—*The Autocar.*

LUBRICATION AND LUBRICANTS.

Perhaps no greater error can be made than one which is made all too often by the amateur machinist, of assuming that oil is oil and grease is grease, and if only enough high-priced oil or grease is applied to an engine or machine, good lubrication must result. Good lubrication involves many points in addition to merely keeping the bearings from overheating by the application of abundant lubricant. The following objects are sought in lubrication in the order of their actual importance:

First: To prevent "cutting," "gripping" or "seizing" of the bearings, or, in other words, to enable the engine or machine to be run without serious injury or positive destruction.

Second: When the first object has been attained, the lubrication must be good enough to prevent overheating of the bearings on a continuous run.

Third: The lubricant must be capable of keeping the rate of wear as low as possible, and

Fourth: The losses of power (and fuel as the source of power) must be reduced to a minimum for the attainment of the full capacity of the engine for doing work; in other words, the friction must be as low as possible.

A good lubricant must possess many characteristics and qualities in order to qualify as a *good* lubricant for the purpose for which it is intended. It must have sufficient "body" to resist being squeezed out of the bearings; it must be as limpid as possible consistent with the first requirement, so as not to put unnecessary drag on the machinery; such comes from the use of a heavy, sticky oil or grease on a light, high-speed bearing. It must retain its normal body while in actual use and not turn thin or watery and lose its lubricating value as the bearing warms up during a hard run. A lubricant ought always to be free from any tendency to gum or turn rancid and cause clogging of the bearings and corrosion of composition metals; it must have a vaporizing or "flash" point (the temperature at which an oil gives off inflammable vapors) higher than the greatest temperature encountered in service and a congealing or "freezing" point below the lowest temperature encountered, so that it may be depended upon to feed under all conditions. All lubricants must be absolutely free from all gritty foreign matter, and, lastly (and quite as important as other conditions), they must have special qualities of *adaptability* for the work to be done in each case, so far as is possible.

Broadly speaking, nearly all lubricants which are sold by reputable and responsible manufacturers may be used without fear of their containing gritty matter or excessive amounts of gumming matter or corrosive acids, but if the best results are to be secured the elements of suitability and adaptability must be carefully sought. The best steam cylinder oils ever refined are not at all suitable for gas-engine cylinders; an oil that shows excellent results for general bearings may fail to provide good lubrication for gears and the grease that leaves nothing to be desired for a constantly cool bearing may melt and rapidly waste away on another bearing exposed to heat from surrounding parts, such as the cylinder of a gas engine. It is of the highest importance, therefore to remember that an oil or grease that may be of the highest quality for one engine or one type of bearing may be of little or no real value on an engine or bearing of another type. It is always a profitable investment of time to experiment with different lubricants until one is found that fulfills the requirements well, and then to stick to that one brand.

Within reasonable limits, bearings may be classified and a limited number of greases and oils produced which will cover all practicable requirements. The choice of lubricants is, nevertheless, a matter that deserves close attention if the best in speed, freedom from wear, and repairs and economy in lubricant bills are to be secured. It must be borne in mind, however, as a well-known authority on lubricants stated, that the cost of lubrication is the cost of the lubricant plus the cost of the friction accompanying its use. The cost of friction is measured in fuel, in wear, in repairs, in delays, and in depreciation to a very great extent, all of which exceed the cost of lubricants many times over, so that it may be stated that that lubricant is the best and the cheapest that reduces friction to the lowest point almost without regard to its market price.

Two classes of lubricants have long been in general use, fluid oils and greases. From a purely theoretical standpoint, oils would seem to be the better lubricants, because the friction of an oil-lubricated bearing is less than that of the same bearing lubricated with grease, because oil is thinner than grease and has less "viscosity" or internal friction with less retarding action. On the other hand practical experience strongly favors grease for certain situations because of its superior cleanliness, because it is easily applied and because grease lubrication is more or less automatic. For instance, no lubricant is consumed except when the bearing is turning; when the shaft begins to turn, the grease is cool and stiff in the cup. As the shaft rubs on its box, heat is generated by friction, warms up the grease and softens it, so that it feeds to the bearing and reduces friction. If more heat is generated the grease flows faster; if less heating occurs the lubricant feeds slower. Thus the lubrication is virtually automatic and the bearing maintains a practically uniform temperature. However, the same friction which melts the grease is an extra drag on the engine or machine, and it is now a well-established fact that grease-lubricated bearings, particularly those on which hard greases are used, wear (by reason of this friction) far more than where a suitable oil is the lubricant.

So, therefore, the advantages of grease in cleanliness, simplicity and reliability are attained at a certain sacrifice of power, fuel, wear and renewal of worn parts.

Oils drip, spatter and cause annoying and expensive damage to clothing and fixtures. Oiling devices are very apt to get out of order and to fail at a critical time. Again, so much oil is wasted outside of bearings and around an engine that its use is not always an economical method, viewed from the cost of lubricants. It has been estimated that for every drop of oil that is actually worn out in lubricating a bearing at least three other drops either never reach the surfaces or pass through unused. Nearly every machinery operator knows of his own experience that all oil-lubricated machinery generally needs *wiping* more than oiling.

There is another class of lubricants known as non-fluid oils which represent a medium between fluid oils and greases. They are produced from fluid oils by treatment that renders them semi-solid, and the extent to which this treatment is carried determines the viscosity or body of the oil. They are not greases in the usually accepted meaning of grease, for their consistency varies but slightly, through a considerable range of temperatures. Their use is claimed to eliminate the drip and waste and muss of fluid oils and the clogging, dragging effect of greases. The method of feeding these oils depends upon the consistency chosen for different work; some non-fluid oils are almost fluid and may be fed in an ordinary oiler, a drop at a time instead of in a stream; others have considerable body and are fed in compression cups or placed in gearcases, etc. The heavier grades are advantageous where the surrounding temperatures are high enough to melt ordinary greases.

As already stated, lubrication is a subject deserving much thoughtful attention from the motorist who is really desirous of securing the best results, for, after all, it is the lubricant that enables the machine to run at all, and it is both a reasonable and exactly true deduction that the better the lubrication, the better, the smoother, the faster will the motor run.

Racing the engine is one of the unnecessary abuses to which many cars are subjected by careless or ignorant drivers. The practice of withdrawing the clutch without throttling or retarding the spark; of letting the car stand with the motor buzzing round till the car is a vibrating blur; of using the low gear with the motor turning over at top speed when a higher gear could be used with a little careful handling—these things take more out of a car than many miles of ordinary road work, waste fuel, cause an unpleasant racket and are of no use anyway.

SPEED CHANGING GEARS---INDIVIDUAL CLUTCH

INDIVIDUAL clutch change speed gear systems, like most other types, are of many varieties, all, however, having gears that are always in mesh, running idly on their shafts when not in use and clutched to their shafts when driving. Broadly speaking, the usual method is to have two sets of gears on two shafts; the driving gears are securely keyed to a shaft direct connected to the engine shaft, while the driven gears, on the secondary shaft connected with the final drive to the rear wheels, run loosely on their shaft till clamped to it by some form of friction clutch, thus causing secondary shaft to rotate and transmit motion to final drive.

In some cases the clutches are in the gearbox, and may be of the ordinary cone type, on a small scale, or of the disk type. Or the clutches may be within the gears themselves and operated by a sliding key or equivalent device. Again, the clutches may be in a separate casing, each clutch connecting with its gear by a sleeve.

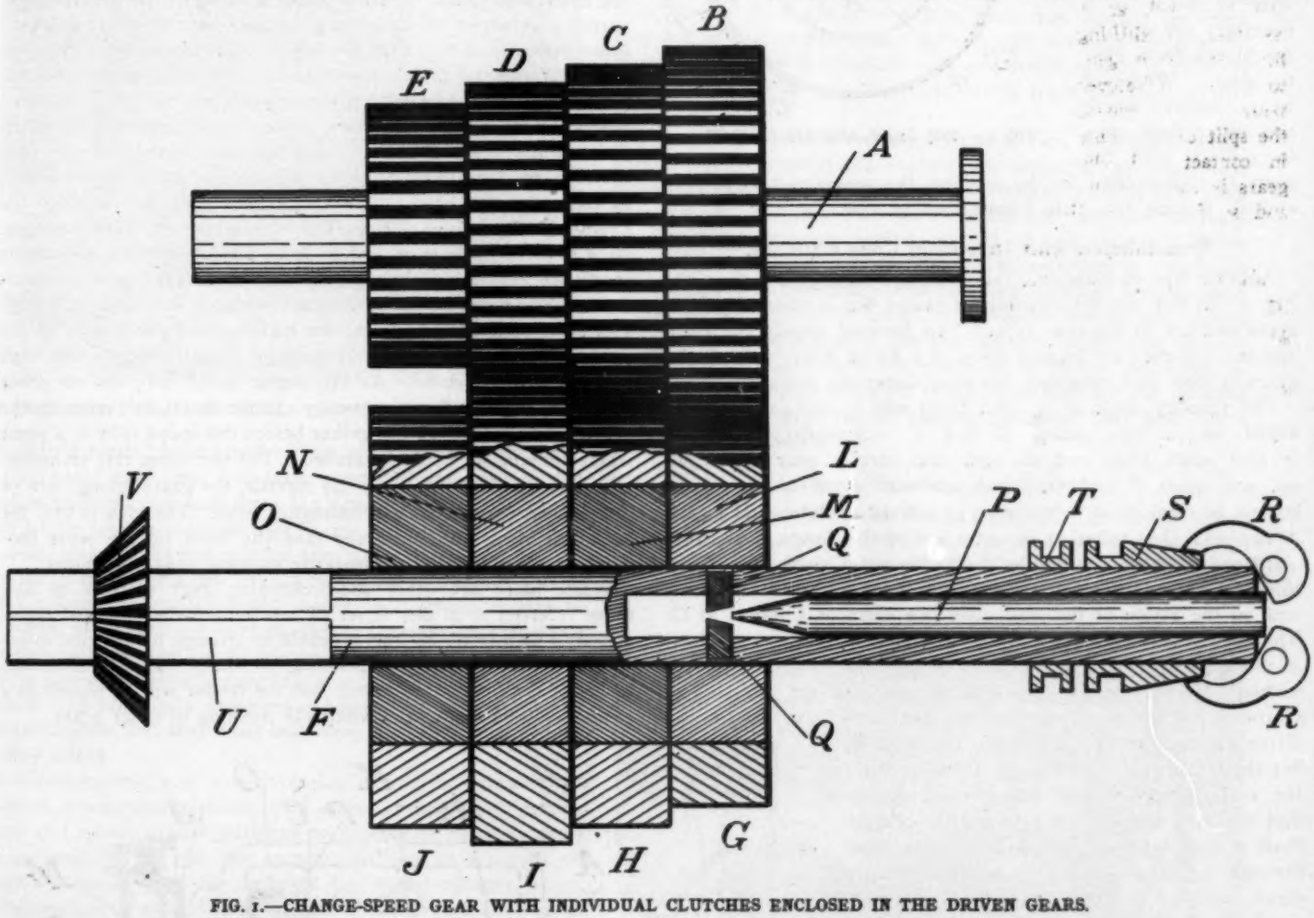


FIG. 1.—CHANGE-SPEED GEAR WITH INDIVIDUAL CLUTCHES ENCLOSED IN THE DRIVEN GEARS.

Transmissions with Internal Individual Clutches.

Fig. 1 shows a change-speed gear in which the friction clutches are contained within the gears. Shaft *A* is connected with the engine shaft permanently and carries four gears, *B*, *C*, *D* and *E*, all securely keyed to the shaft and always rotating with it. Shaft *F* carries four gears also, *G*, *H*, *I* and *J*, which run idly on their shaft when not driving. Gears *G*, *H* and *I* are respectively meshed with gears *B*, *C* and *D* and are for the three forward speeds. Reverse is obtained by means of gear *J*, which meshes with a pinion not shown, which in turn meshes with gear *E*, giving reverse motion.

Each one of the gears on shaft *F* is mounted loosely on a collar, these collars being shown at *L*, *M*, *N* and *O*. While the gears can rotate easily on the collars, the latter cannot rotate on shaft *F* because each collar carries a feather which enters a keyway cut in the shaft. Each collar is split diametrically, the two halves being held in their places by the encircling gear. It will be readily understood that if one of the split collars, say collar *L*, is caused to expand against the inner periphery of gear *G* until the friction is sufficient to prevent the gear from running around on the collar, the shaft *F* will be caused to rotate with the gear, the collar being fast to the shaft. This is exactly what happens when the gear is engaged. Shaft *F* is hollow, and in it slides a rod *P* with its inner end tapered. Four little steel blocks, two of which are shown at *Q Q*, are loosely set in holes drilled radially through the shaft. When the tapered end of rod *P* is brought between the inner ends of these little blocks they are forced outward against the split collar, and the collar is, in turn, forced out against the gear, setting up sufficient friction to cause the gear and collar to hold together and rotate as one. Shaft *F* can be moved bodily longitudinally, so that the blocks *Q Q* can be brought under any set of gears required. When it is desired to engage any particular gear, shaft *F* is first moved until the blocks *Q Q* are under the proper gear, when the rod *P* is pushed between the blocks *Q Q* and the collar expanded against its gear. Rod *P* is moved by fingers *R R*, which, in turn, are actuated by cone *S*. The cone carries a groove for the usual fork or collar. Collar *T* is fast to the shaft and carries a fork for obtaining the longitudinal movement of the shaft.

A vertical section through a complete gear and clutch is shown in Fig. 2. Gear *A* runs on the split collar *B B*; feather *C* enters a keyway in shaft *D*, so that shaft and collar must move together. In the hole *E* in the center of the shaft is the rod *F*, whose tapered end acts as a wedge and, when pushed forward,

forces the steel blocks *G G G G* outward and presses the halves of the collar hard against the inner periphery of the gear *A*. Of course if the wedge is not pressed in hard, the gear will slip on the collar, so that the drive will be taken up gradually. The whole transmission runs in oil, so that all the frictional parts are well lubricated. Moreover, the oil that penetrates between the collar and gear while out of engagement serves to prevent undue wear when running idle and also prevents too sudden engagement when the wedge is pushed home.

Referring again to Fig. 1, there is a square part *U* on the shaft *F*, sliding longitudinally in a corresponding squared hole in the bevel pinion *V* through which the chain shaft is driven. This permits the shaft to slide lengthwise as much as is necessary for shifting the blocks from gear to gear. Whatever wear occurs where the split collars come in contact with the gears is compensated for by pushing the wedge-rod further in and so forcing the little blocks further out.

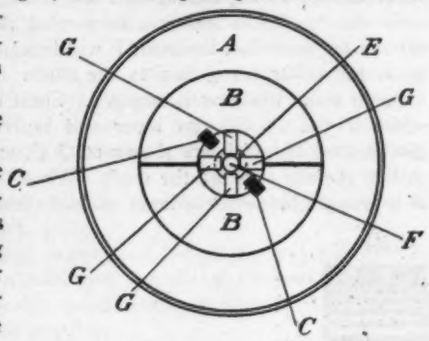


FIG. 2.—ONE GEAR AND ITS CLUTCH.

Transmission with Individual Cone Clutches.

Another type of individual clutch change-speed gear is shown in Fig. 3. In this case the clutches are placed beside their respective gears and are of the cone type. Two forward speeds are given and one reverse; the highest speed is a direct drive with all the gears in mesh and revolving, but none doing any work.

The primary shaft *A* is solid from end to end, and carries, keyed to it, two gears, *B* and *C*. Secondary shaft *D* is also solid from end to end, and carries gear *E*, keyed on, and gears *F* and *G*, which are not keyed to the shaft, but can be clamped to it by means of individual clutches *H* and *I*. A casting *J O* is bolted at its outer end to the flange on the forward end of the propeller shaft. As the solid black lines show, this part extends through the gearcase in the form of a sleeve, and on the inside of the case takes the form of a flange at *O*. The rear of shaft *A* passes through *J*, turning freely in it. Now, if the engine is started, the primary shaft *A* will rotate freely without driving the car, provided the clutches are disengaged. Gears *B* and *C*, being keyed to the shaft, will turn with it and drive gears *G* and *F*, which idle on shaft *D*, but shaft *D* will not rotate. In order to drive the rear wheels of the car it is necessary that connection should be established between shaft *A* and the propeller shaft. This is done through the casting *J O*. To obtain the high speed, which is a direct drive, the high-speed clutch *P* is pressed home by means of the sliding collar *K*, which has a cone that acts on the dog *L*. The collar, dog, the intermediate plate and the clutch all rotate with shaft *A*, and when the clutch is engaged with its counterpart in the casting *J O* the propeller shaft is driven with the primary shaft. Cone clutch *M* is also keyed to the shaft, and engages at the same time as clutch *P*, so that a double grip is available for the direct drive. No gears are driving, though all are in mesh and all in motion, running idle.

The low is engaged by moving the sliding collar *N* to the right so that its cone engages the dog which forces the cone clutch *H* and the gear *F* together, thus causing the gear to be clamped to its shaft. The drive is now from the engine to shaft *A*, from gear *C* to gear *F*, causing the countershaft to revolve, and from gear *E*, which is keyed to the countershaft, to gear *O*, formed integral with the casting *J* bolted to the propeller shaft flange. With the gears in this position *O J* is revolving in the same direction as the shaft *A*, but at a slower rate of speed. For the reverse, the sliding collar *N* is placed as shown in the drawing, and the drive is now through shaft *A* and pinion *B* to gear *G* through an intermediate pinion not shown, and through the countershaft and pinion *E*, through *O J* to the propeller shaft. With a change-speed gear of this type it is, of course, unnecessary to use a clutch between the engine and the transmission, and, as the drawing shows, none is used in this case, engine and transmission shafts being direct connected.

An Automatic Gear-changing System.

An exceedingly interesting transmission of American origin is automatic in its action, the gears changing automatically to suit the road conditions. Broadly speaking, this transmission is of the individual clutch type, the clutches being of the multiple disk variety. A series of weights, arranged on the centrifugal governor principle, rotate with the engine shaft inside the hollow flywheel. When the shaft commences to rotate the governor weights commence to fly outward, but the engine runs free until the speed reaches about 300 revolutions a minute, when fingers actuated by the weights press the plates of the low-speed clutch together and the low-speed gears take up the drive. The plates of the clutch of course slip at first, but take hold firmly as the speed of the engine increases and the governor weights act more strongly. Now if the throttle is opened so as to further increase the engine speed, the governor weights will fly out still further and compress the spring which has hitherto kept the clutch for the next higher speed out of engagement. As the higher speed gears take up the drive, the lower speed gears overrun on silent ratchets. The high speed is a direct drive. As the engine speed falls, on the other hand, the gears will automatically change down by reversing the process, and will let go altogether before the speed falls to a point where the engine would be stalled. The car using this transmission is controlled entirely by the throttle, the gears taking care of themselves; there is no gear-changing lever. The idea is that the gear will always automatically take the drive on the most economical speed for the momentarily existing road conditions.

While there are other speed-changing gear systems in use, those referred to in this series of articles are the principal types. It would manifestly be impracticable to attempt to describe every variation in use; but in describing an easily comprehended example of each type, it is hoped that the reader will be placed in a position to figure out for himself the working of other gears.

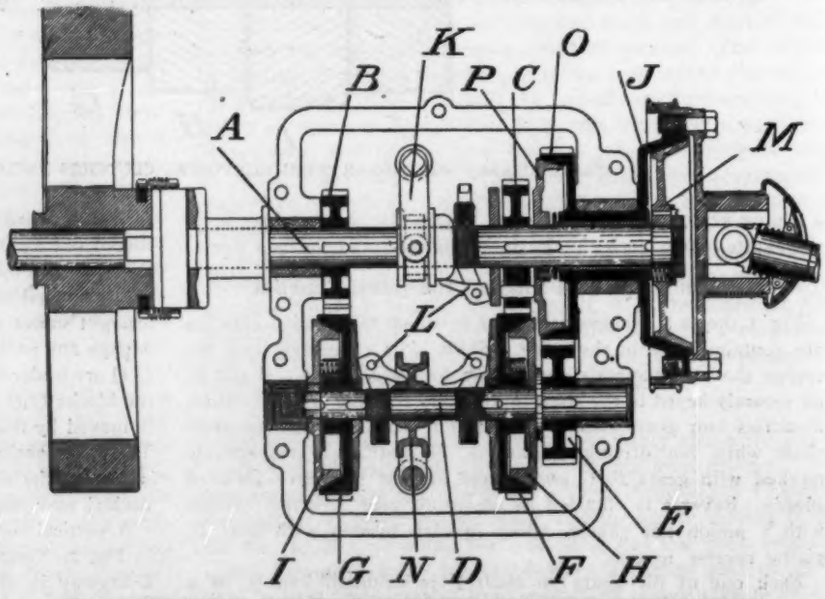


FIG. 3.—INDIVIDUAL CLUTCH CHANGE-SPEED GEAR WITH CONE CLUTCHES.

DEVELOPMENT OF BUGGY TYPE WESTERN CARS

By HARRY W. PERRY.

AN interesting development in automobile construction has been going on in the Mississippi Valley, quietly and unnoted, almost from the earliest days of the industry in America. Physical and financial conditions west of Pennsylvania were and still are so very different from those existing in the East as to create a need and persistent demand for a type of machine especially designed and built to meet the requirements, and differing radically from the types of cars developed in Europe, which have furnished models for the American manufacturers.

FIG. 1.—HOLSMAN RUNABOUT—CABLE DRIVE AND NO DIFFERENTIAL.

The prairie roads of the Middle West offer serious obstacles to low-hung, heavy cars fitted with large pneumatic tires, and in that land of magnificent distances there is a large percentage of the population which really needs the time-saving aid of the automobile, but whose pocketbooks are still too thin to warrant them in paying $1,000 or more for a car. What they want is a cheap, single-seated runabout and double-seated surrey, built strong enough to stand rough usage, and yet light enough to be easily rescued from a mudhole without the aid of horses. Such machines must be simple in operation, readily repaired by a person of ordinary intelligence, and not easily deranged. Appearance is a matter of last consideration, but they must be, above all things, of practical, every-day utility.

The demand came, and is now coming in greater volume than ever, from prosperous farmers, land agents, traveling salesmen, doctors, and others whose business or profession requires them to make long drives into the country districts in all sorts of weather. Many of them live in small towns and villages, where it is impossible to secure the services of an expert automobile repair man when anything goes wrong with the machine; the roads in dry weather are often little more than trails worn in the prairie soil, consisting of tracks from six inches to a foot deep, where the wheels of wagons run, and with one or two high, grass-grown ridges between them—obstacles that low axles and differential cases often will not clear. In wet weather the mud and clay is of a consistency that causes it to stick to and clog up small, thick-spoked wheels, and present a serious resistance to progress.

With these and similar conditions in mind, a number of independent Western constructors have been working out the problem, each in a small way and without much ado, until now they are building enough machines of similar character so that they can be classed together into a distinctive group with sufficient representation to warrant special notice.

General Characteristics of the Cars.

Because they follow the general lines of light horse-drawn vehicles very closely, they may be designated as "buggy type" cars. They are distinguished primarily by buggy wheels of large diameter, with slender spokes, small hubs, narrow felloes, and shod with solid rubber tires. They have plain piano-box bodies, set high above the ground, usually on elliptic springs. Resemblance to the runabout buggy is increased by the use of a buggy seat, sometimes of the spindle pattern and with a back lower than the "bucket" seats of the more pretentious automobiles, and not divided for individual seats. In most cases the tops of the wheels are higher than the sides of the body, the rear wheels rising quite to the height of the seat cushions. The stationary front axle is a characteristic that belongs to the automobile, for most of the machines have the front wheels mounted on steering knuckles. Each axle is in one piece and solid, the differential, when there is any, being located on the countershaft. When mud fenders are fitted they are of the narrow buggy pattern, and although there never is any horse in front to splash mud and water against it, there is always the customary leather dash rising from the front of the body.

Engine and transmission characteristics vary with the different makes, but in general the engines are supported on the frame under the center of the body in a horizontal position extending fore and aft. Either one or two cylinders are used, and they may be air cooled or water cooled, and, if of two cylinders, either opposed or disposed side by side. Transmission is simple, in most cases with planetary change-speed gearing, but in some makes with no properly called change-speed mechanism. Drive is by one or two chains to the rear wheels, or by rope or wire cable to both rear wheels. Prices vary, of course, according to differences in construction, but range from $250 for the cheapest and simplest to $750 for a "touring runabout" and $900 for a four-passenger surrey.

Holsman Runabout and Surrey.

One of the pioneers in this line of automobile development was the Holsman Automobile Co., of Chicago, whose experiments began back in the late '90's, and which, oblivious of ridicule and a contemptuous refusal to consider its product seriously, has steadily developed the idea of the "horseless carriage" until it has brought this type of vehicle to a mechanical and commercial success, and is building and marketing them on a considerable scale, having recently erected a three-story factory 250 by 50 feet. In its perfected state the Holsman runabout is shown in Fig. 1, fitted with buggy top. In Fig. 2 is shown the Holsman surrey, which is, so far as known, the only four-passenger vehicle built with the characteristics mentioned. It is practically a mechanical duplicate of the runabout, but has a slightly longer wheelbase,

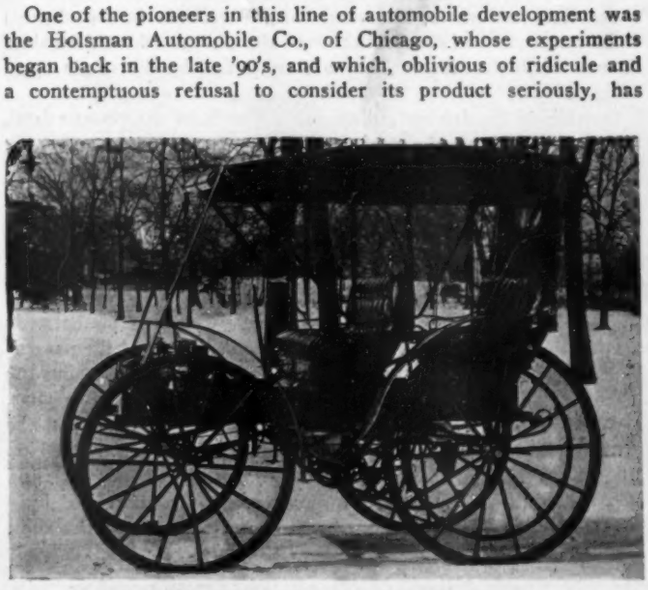


FIG. 2—HOLSMAN SURREY, WITH REAR ENTRANCE TO REAR SEAT

longer body, and different spring suspension. The greatest difference between these vehicles and the automobiles built on Continental lines is their extreme simplicity. They have no clutch, no change-speed gearing, no pedals, only one lever besides the steering tiller, no divided rear axle and differential, no radiator and circulation system, no side drive chains, no transmission brakes, and not even a true frame.

Air-Cooled Engine and Steel Cable Drive.

The solid square axles that connect the pairs of road wheels are connected by two long side springs, as in the Oldsmobile runabout, and a 10-horsepower, two-cylinder, opposed, air-cooled en-

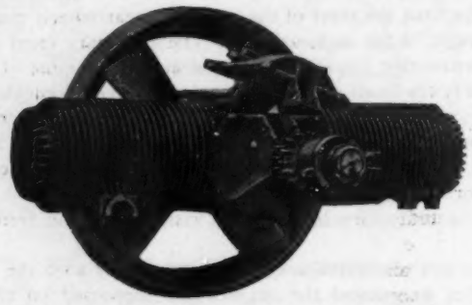


FIG. 3.—OPPOSED AIR-COOLED HOLSMAN ENGINE.

gine is carried longitudinally at the center of the running gear on two transverse members of iron riveted to the side springs. The piano-box body is also attached to and supported by the springs. Directly under the engine crankshaft is a long shaft hung on swinging brackets and carrying a large sprocket, that is chain-driven from a smaller sprocket on the crankshaft on the opposite side of the engine from the flywheel. At either end the countershaft carries grooved pulleys in alignment with similarly grooved channel rings of very large diameter, attached to the spokes on the inside of the rear road wheels. Steel cables pass from the pulleys around the grooved rings and transmit the drive. Long brake shoes that conform to the shape of the grooves in the channel rings are mounted between the rings and pulleys where the cables do not touch the rings. They are controlled by the single operating lever.

Outside of the driving pulleys, on the ends of the countershaft, are two reversing pulleys of small diameter that engage directly with the solid rubber tires of the rear road wheels when the shaft that carries them is moved backward by means of the operating lever, which also controls the tension on the driving cables. When the shaft is moved backward to engage the reversing pulleys, the cables are slacked sufficiently to slip in their pulleys and offer no resistance to the backward motion of the drive wheels. Slippage of the cables in their pulleys also compensates between the rear wheels when rounding corners, the weight of the passengers being thrown more upon the outer wheel and increasing the tension of the cable on that side while the opposite cable slips, just as the wheels of street and railroad car trucks slip on the rails when rounding curves. The front wheels are mounted on Elliott steering knuckles and move independently of the rigid axle, as in all automobiles; their movements are controlled by a horizontal lever mounted on a vertical steering post at the right side of the car.

Large Wheels and Choice of Treads.

The rear wheels are 48 inches in diameter and the front ones 44 inches, all fitted with 1 1-8-inch solid rubber tires. Any tread or gauge can be had, from 56 to 62 inches, which is an important feature in the western country, where the gauge of the wagons is generally broader than the eastern standard of 56 or 56 1-2 inches. The large size of the wheels enables the vehicle to ride easily over rough roads and to sink deep into ruts and mud without allowing any part of the machinery or axles to drag. At the same time the form of drive permits of following the principles that have been evolved through centuries of wagon wheel construction, such as the dished wheel, the cambered or bent axle to cause the wheels to set in at the bottom, etc. Another point emphasized by the builders is that the driving effort is applied to the spokes close to the rim, where the force is applied to the ground, which permits the use of small hubs and comparatively light spokes. The solid tires of course, are proof against puncture and blowout, and are as inexpensive as the rubber tires now so generally fitted to light horse-drawn pleasure vehicles.

Details of the Engine.

Because of the direct way in which it is applied, the 10-horsepower furnished by the opposed 4 by 4-inch cylinders is ample to drive the 800 or 850-pound vehicle at twenty-five to thirty miles an hour on the boulevard or through deep sand or mud and up steep inclines; for excessive grades there is a separate chain and sprocket, giving a larger ratio of reduction between the crankshaft and the swinging countershaft.

The heads of the motor screw into the cylinders so that they can be removed for cleaning; there are no gaskets. Inlet valves are automatic, and there are petcocks for relieving the compression when starting. The engine can be started from the seat, the starting crank being on the right-hand side of the seat. Fan spokes in the flywheel assist in cooling, and the radiating fins cast on the cylinders extend all the way down to the crankcase (Fig. 3). There is a removable cover on the case, which makes all crank and piston-rod bearings accessible. Ignition is by jump spark from dry cell batteries, and the spark is automatically advanced by simply reversing the starting handle.

The location of the engine, almost in the plane of the axles, brings the center of gravity very low and at the same time leaves the body clear for carrying packages. Thus, the runabout shown in Fig. 1 has an open space 28 by 27 inches in front of the seat, and at the rear has a carrying space 28 by 18 inches, with cover and lock. The gasoline tank, which is in the back of the seat, holds 5 1-2 gallons of fuel, sufficient for about 100 miles of travel. The batteries, spark coil and tool-box are behind the dash.

In addition to the regular runabout and the surrey illustrated, the Holsman company makes a touring runabout which is the same as the surrey, but has no rear seat. It weighs fifty pounds more than the regular runabout, and is adapted for canopy or extension top.

"Reliable Dayton" Twin-Cylinder Runabout.

Another Chicago machine possessing many of the characteristics of the foregoing is the "Reliable Dayton," shown in Fig. 4, built by the Dayton & Mashey Automobile Works, in Chicago. Work on this make dates back to 1903, when the first engine was built. Simplification of construction is carried through all parts, including the engine, which is of the three-port, two-cycle type,

FIG. 4.—"RELIABLE DAYTON" TWIN-CYLINDER TWO-CYCLE RUNABOUT

having no valves and therefore no camshafts, gears and springs to operate them. There are two cylinders of 3 1-2 inches bore by 3 1-2 inches stroke, mounted side by side in a longitudinal position under the middle of the body. The cylinders are water-cooled. Ignition is by jump spark, from two sets of ten-cell dry batteries. An extension of the crankshaft on the right end carries the flywheel and also a two-speed planetary gear.

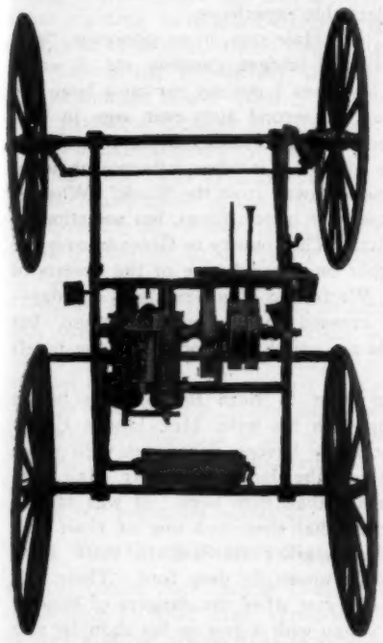


FIG. 5.—SIMPLE CHASSIS OF THE DAYTON.

This power plant is mounted on two cross members connected with two long side springs that connect the front and real axles, as illustrated in Fig. 5. A cross shaft beneath the engine terminates in small sprockets at its ends, over which run driving chains to large sprockets attached to the rear road-wheel hubs. A short chain transmits the driving power from the crankshaft to the cross shaft, with considerable speed reduction. The countershaft is made from 1 1-4-inch solid stock from one end to the other. Near the middle it carries a differential gear, to which is brazed a steel sleeve that carries the other sprocket wheel at its outer extremity. The planetary gear gives direct drive, with no gears in motion when the high-speed clutch is engaged. Low-speed gear gives a reduction of three to one, and the reverse gear a ratio of five to one. Any speed up to twenty-five miles an hour is claimed for the car. All gears run in an oil bath. Lubrication of the engine is by pressure feed. Foot brakes operate on the differential.

The body is of the piano-box runabout style, 34 by 66 inches, and is mounted on the middle sections of the side springs. Front and rear axles are of the solid, square-section pattern, from 1 1-4-inch stock, and the front wheels turn on Elliott type steering knuckles which are connected to a side steering lever. The road wheels are of 40 and 44 inches diameter front and rear, have 1 1-4-inch spokes and are fitted with 1 1-8-inch solid rubber tires. These high wheels and the absence of differential gearing in the rear axle give the vehicle a road clearance of twenty-two inches, sufficient to clear large stumps and boulders. Seven gallons of gasoline, enough for a run of 125 miles, can be carried in the fuel tank, and the water tank holds three gallons. The seat is upholstered in leather, there is a full rubber top, and side and front storm curtains are regularly furnished. The vehicle is also equipped with side and tail lamps. Complete, it weighs from 650 to 700 pounds.

Jewell Single-Cylinder Car.

After eight years of experimental work by two mechanical engineers, the Jewell automobiles (Fig. 6) were placed on the market last year by the Forest City Motor Car Co., of Massillon, Ohio. These machines more nearly resemble the American type of automobile than the vehicles already described, yet they possess a number of the characteristics of the horseless carriage. The wheels, for example, though of uniform size, are large in proportion to the size and weight of the vehicle, measuring 32 inches in diameter, and they are fitted with 2 1-2-inch cushion rubber tires. The large wheels and absence of a differential in the solid rear axle give a road clearance of fifteen inches. Bodies are of the piano-box and simple stanhope styles, with patent leather dashes in front and covered rear space for packages. Steering is by curved tiller rising from the middle of the body bed in front. Narrow patent leather mud fenders over all wheels heighten the buggy effect.

All of the machinery and the bodies are supported on an angle steel frame having three-point elliptical spring suspension, the single front spring extending transversely in the plane of the front axle. Axles are of I-beam section.

The main feature of the power plant is a single-cylinder, water-cooled engine of the two-cycle type, which eliminates the parts needed for the use of valves in the four-cycle motor. As there is an impulse at every outward stroke of the piston, the engine, with its 4 1-2-inch bore by 4-inch stroke, is said to develop a full 8 horsepower. The engine is located directly under the seat, the flywheel being in the center and the crankshaft carrying a planetary change-speed gear on the side of the flywheel opposite to the engine. A single chain transmits the power from the engine shaft to a differential on a parallel countershaft located slightly below and to the rear of the crankshaft. Side chains deliver the drive from sprockets on the ends of the countershaft to sprocket wheels keyed to extensions of the rear wheel hubs. Two hand levers at the side of the seat control the two forward speeds and reverse, while transmission and hub brakes can be set by pedal and hand levers. The speed range is from four to fifteen miles an hour. Positive circulation of the cooling water is maintained by a geared pump through a fin tube radiator under the frame. Jump spark ignition is employed. Sufficient fuel and lubricating oil can be carried for 100 miles of travel.

The wheelbase measures 60 inches and the tread 46 inches. The body measurements are 28 by 56 inches. Weight complete is 700 to 750 pounds, and equipment includes side lamps, horn and tools.

"Success" Runabout for Mail Carriers.

With the special object in view of supplying a type of automobile that would meet the requirements and come within the means of rural free delivery mail carriers, the Success Automoblie Co., of St. Louis, Mo., has just brought out the vehicle shown in Fig. 7, which it has called the "Success." It is a standard road wagon with the shafts removed, wheel steering substituted, and a gasoline motor bolted on to the outside of the piano-box body. By making

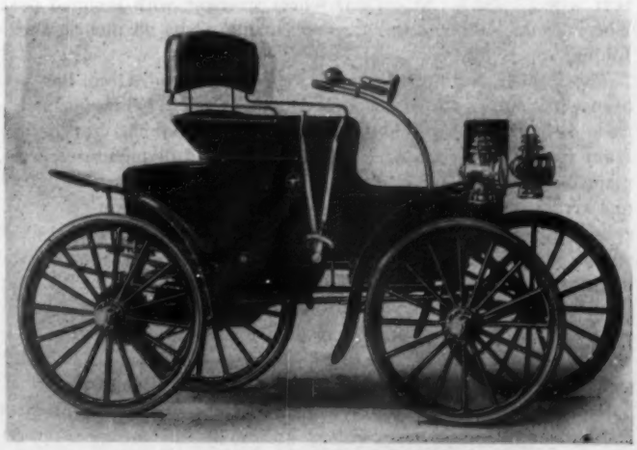


FIG. 6.—JEWELL TWO-CYCLE SINGLE-CYLINDER CAR.

as few constructional changes as possible, the builders have been able to get the selling price down apparently to the very minimum. The necessity for this is evident when it is known that our government allows the rural mail carriers only $720 a year and requires them to provide their own conveyances.

The engine used is of 6 horsepower, with a single cylinder, air-cooled, and set in an upright position. Its flywheel is carried inside of the circular crankcase, as in motorcycle engines. The carbureter, sparking mechanism and lubricator are directly attached. Drive is from a small sprocket on the end of the crankshaft next the body to a large sprocket wheel on the end of a coun-

tershaft, on which is mounted a two-speed planetary gear. From the countershaft a single roller chain transmits the drive to the left rear wheel. There is no differential. There are two band brakes on the transmission. Steering is by hand wheel, mounted on a vertical column and controlling the front axle by means of a chain and sprocket.

The front wheels are 40 inches in diameter and the rear ones four inches larger. All are shod with one-inch steel tires. The body, which is suspended on two transverse elliptical springs, measures 23 by 56 inches. The gasoline tank holds one and one-half gallons, said to be sufficient for a day's work.

Later Additions to the Ranks.

Besides the foregoing, there are several experimenters who have brought their productions to a practical state within the last year or two. They have, however, not yet attempted to market their machines extensively and have not responded to a request for detailed information. Among these is the Practical Automobile Co., of Aurora, Ill., maker of the Culver runabout. Its car has 38 and 40-inch wheels, whose one-piece solid axles are connected by two side springs. The tires are solid rubber. A three-

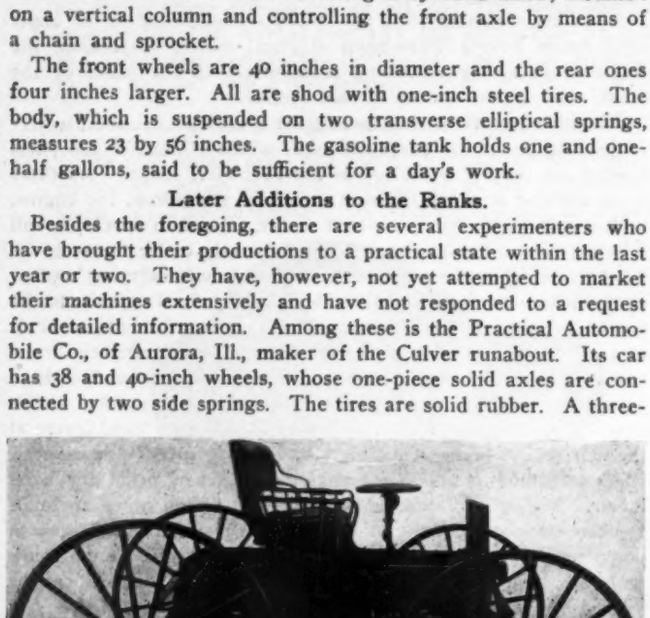


FIG. 7.—SUCCESS BUGGY WITH BICYCLE TYPE MOTOR ATTACHED.

cylinder, 6-horsepower, horizontal opposed motor is carried under the body by the side springs. Drive is transmitted through a two-speed planetary gear on a countershaft by side chains to the rear wheel hubs. The car has wheel steering, with inclined post. The body has a carrying space measuring 28 by 28 inches, and a folding top is fitted.

The Palmer Automobile Mfg. Co., of Cleveland, Ohio, has also been working on a low-priced runabout properly belonging in the class of buggy type machines. It is called the Palmer, has 32-inch front and 36-inch rear wheels, fitted with solid or pneumatic tires, piano-box body, wheel steer, and three elliptic springs, the front one arranged transversely. The power plant consists of a single-cylinder, two-cycle, water-cooled engine of 4 1-2-inch bore and stroke, carried in an upright position under the rear end of the body behind the rear axle. This drives to a countershaft under the middle of the body by wire cable, and from pulleys on the ends of this shaft cables pass around grooved rings on the rear wheels. Four forward speeds and reverse are provided. The total weight is placed at 800 pounds.

No doubt there are other Western builders working along lines similar to those of the machines described, but information regarding them is unavailable.

There is a humorist at Huntington, Long Island, whose practical joking proclivities led him to lay hands on a road sign reading, "Slow down to eight miles an hour," and anchor it in the bay, where passing gasoline motor boats were scared nearly out of the water by the supposed attack on their liberty. And the same joker placed a "Y" after the word EIGHT on a similar road sign in its rightful position, and at one fell swoop raised the speed limit to EIGHTY miles an hour. Automobilists looked twice at the sign, set their jaws sternly and opened 'er up wide. Even drivers of horses made feeble efforts to get within sight of the limit, and it was some time before the local authorities could stop the procession of speeding vehicles.

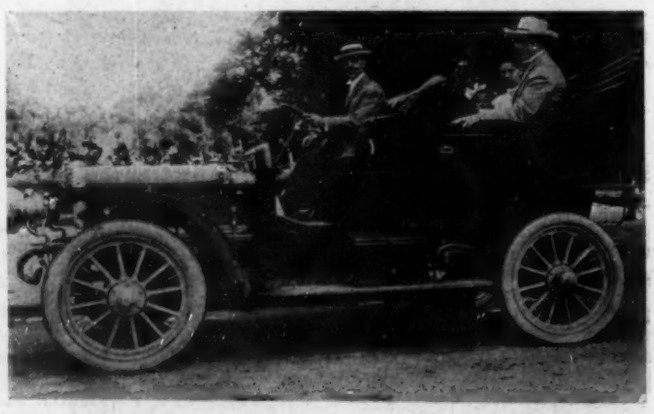
SPAIN A POOR AUTOING COUNTRY.

Walter Hale, of New York City, has just arrived in Paris after an interesting 1,200-mile tour in Spain and France in a 20-horsepower Cleveland. Mr. Hale, who has toured in nearly all parts of Europe, declares that his present experience has been the worst, and he urges automobilists contemplating trips in Spain to consider the matter prayerfully before entering upon what is likely to be an unpleasantly unforgettable experience.

"We landed in Gibraltar," Mr. Hale says, in an interview, "and, because of military regulations of bridges, gasoline, etc., it was a week before we got away, and then I put my car on a boat and went to Malaga. Mine was the second auto ever seen in Gibraltar, and the other belonged to Lord Charles Beresford. I suppose he had an easier time of it, but it takes influence about as great as his to get an automobile away from the 'Rock.' When at last we got to Malaga I hoped for better things, but sometimes I wished I was back at Gibraltar. The country to Grenada over the Sierra de Alhama and further on, reminds one of the deserts of Arizona and New Mexico. We forded fifteen rivers in one day—that's a sample—not just crossed them, you understand, but forded them all. The roads are rough and rocky and the hotels along the way are bad."

Mr. Hale from Grenada went to Baza through the bandit country. He made the trip with his wife, Mrs. Louise Closer Hale, whose novel, "A Motor-Car Divorce," has met with much success. They were warned of the dangers, but Mr. Hale preferred to take the risks rather than turn back. It was at this exciting stage of the journey that they had one of their few breakdowns, he longsuffering sparker refusing to work after being plunged into water in an unusually deep ford. Their halt came at night, in the rain, and, just when the dangers of bandits seemed very near and real, a man with a gun on his shoulder and murderous-looking knives at his belt appeared. Before Mr. Hale could get out his money and his watch the man revealed himself as a rural guard on the lookout for bandits, and he kept watch over the stranded automobilists until a passing wagon took them to a village several miles away. The man guarded the automobile for the rest of the night and the next morning, until Mr. Hale returned with the mules. The daylight disclosed a cross set by the roadside a few feet from the stalled automobile to mark the spot where brigands lately murdered a traveler.

"That was our only serious breakdown in 1,200 miles," said Mr. Hale, 'and I am well satisfied with my American machine. My tires were American, too, the Dunlop, and I had only three punctures and arrived in Paris using the same tires I started out with. But it is a trip I should not care to repeat. I have been through Mexico, and I was in Venezuela during the blockade, but I have never known a wilder country or one where civilization seems so far away. English is not spoken anywhere except at Grenada, and they are as ignorant of French. Garages are few and far between, and often gasoline is procured only with great difficulty."



SENATOR DICK, OF OHIO, AND DAUGHTERS IN MODEL K WINTON.

THE TOURING CLUB OF FRANCE

PARIS, July 17.—One hundred thousand is now the effective roll-call of the Touring Club de France, an organization which only sixteen years ago had a total membership of four. For about eighteen months an attempt has been made to reach the round sum of 100,000, but no sooner was the secretary on the point of announcing his victory than death and withdrawals brought the number down. Now it is accomplished, and to celebrate the 100,000, a monster fête was held at Versailles June 7. Processions of automobilists, cyclists, motorcyclists and pedestrians traveled out from Paris by different routes under their different motive power, and united in the town of Roi Soleil for a monster banquet, speechifying, balloon display, and general rejoicing in a manner only possible to a French temperament and under a French sun.

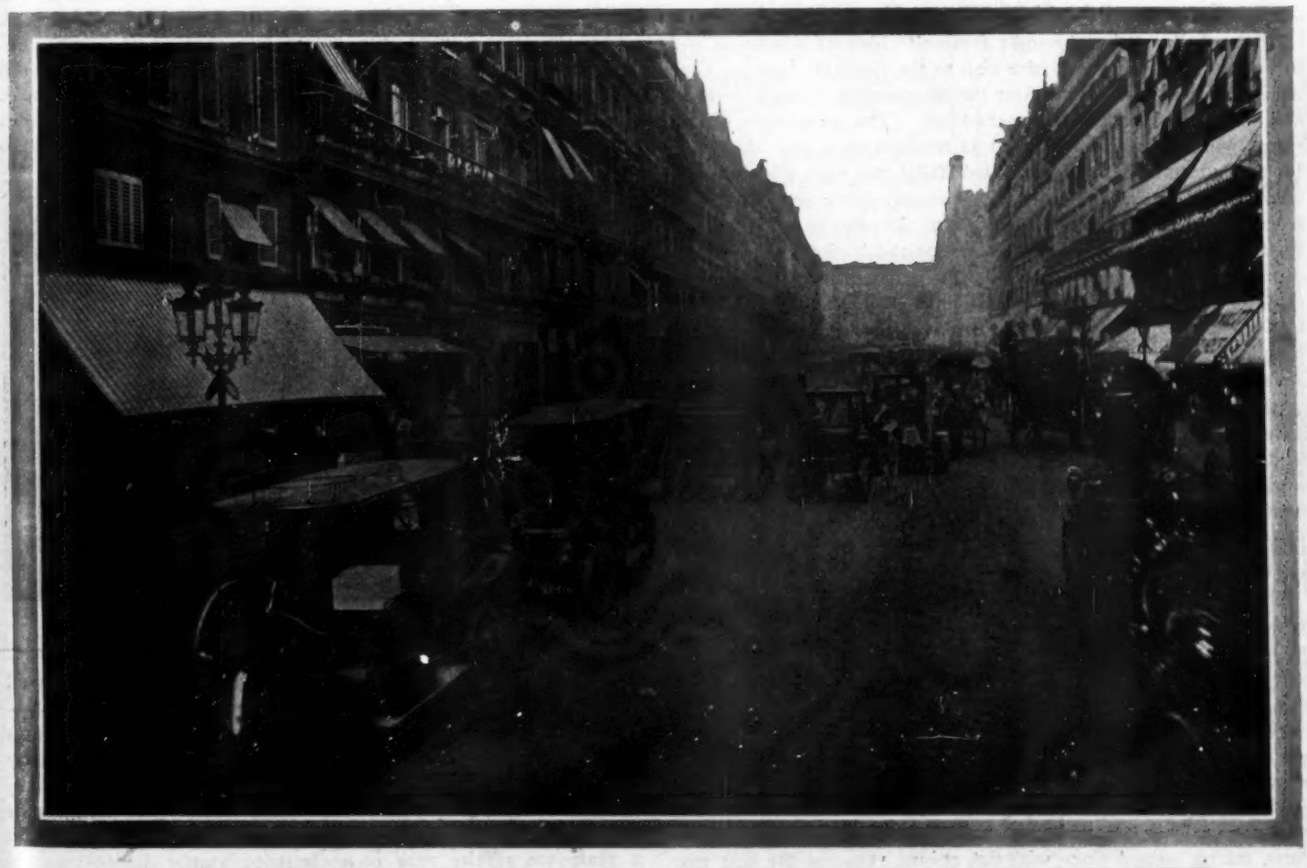
The Touring Club of France is not an automobilists' society, nor a cyclists' organization, nor a pedestrians' body, but a union of all who give themselves up to touring. Its founders in 1890 were cyclists, and its early members were all cyclists, but as the club grew and as automobilism became more numerous, and touring in various forms developed, a much wider representation was obtained. At the present time automobilists and cyclists form the backbone of the club, other classes of travelers being present in smaller but not negligible quantities.

The Club's Perfect Signboard System.

From the outset the Touring Club of France has sought to make traveling by road easy, agreeable and popular, and it is largely owing to its efforts that motoring is more agreeable in France than in any country in the world. Distance and danger signposts have been placed on every road in France, and there is not now a single highway throughout the land without its clearly visible T. C. F. distance board giving the name of the locality, the two important centers which the road connects and the distance from each. Every danger spot on all the main roads has been marked by such signs as "Ralentir—Passage à Niveau" (Slow-grade crossing), "Descente rapide, Fournants dangereux" (rapid descent, dangerous turnings), etc. No fewer than 16,000 signposts have been placed on the road. In conjunction with the government road department (Ponts et Chaussées). The club has done much to improve the highways of France. Several new roads have been constructed entirely at the club initiative, the most important of which was the Esteral road inaugurated in 1903. Tracks have been made through the national forests and over mountain land where previously no communication was possible, the entrances to towns, often so difficult in France, have been improved, cobble stones removed and replaced by macadam, and in many cases a loop road opened up by which the rough stone paving of an old-world town would be avoided.

Road Makers Cared For and Hotels Improved.

Much of the pleasure of the automobilist depends on the way in which the man with the shovel and the wheelbarrow on the roadside does his work. The club realized this and looked after the interests of these humble but useful workers by forming a roadmen's relief fund, which last year distributed $3,552 to wounded and sick roadmen or their widows and orphans. The total amount of relief distributed up to the end of last year was nearly $25,000. Whilst the roads were being improved a complete system of maps and guides was organized, and in no matter what corner of France the T. C. F. member may wish to travel he



FASHIONABLE SHOPPING HOUR IN THE RUE DE LA PAIX, PARIS, WHEN THE AUTOMOBILE TRAVEL IS THE HEAVIEST.

has but to apply to the map department to obtain all the information he could wish for. Foreign members find this particularly useful, and never a day passes during the touring season but a certain number of American visitors call at the club room in the Avenue de la Grand-Armée, Paris, for advice, maps and guide books.

The roads improved, attention had to be given to the hotels. It was not an easy task, for although the French aubergiote could always provide a good meal, he was utterly lacking in notions of cleanliness. The T. C. F. has and is still drilling him in the ways of propriety, and whenever the foreign visitor sees the club sign over an inn door he may enter without fear or trembling. A model room with simple cleanly fittings, a bath and other necessaries for the traveler has been devised by the club and its adoption is urged upon all hotel keepers desirous of having the patronage of the club.

The T. C. F. "Tryptique" an "Open Sesame."

Custom formalities have been simplified for T. C. F. members, and now, instead of depositing the necessary sum with the government official on the frontier, the amount can be left with the club and a document obtained which will allow most European countries to be entered and left any number of times without other formality than the presentation of the document.

American automobilists, members of the club, intending taking a trip to France, can deposit the customs duties in advance with the club officials and receive in return a document allowing their machine to enter the land of liberté, égalité, and fraternité, as simply as it enters the home garage. Obtain a "tryptique" at the club rooms in Paris and the automobilist may travel through Europe without laying down a cent on the frontiers.

As membership is but one dollar a year, and all members of the A. A. A. are immediately admitted on request, and other persons on the proposition of two existing members of the club, it is worth while becoming a T. C. F'ist, even for a single visit to Europe.

Progress of the Club's Sixteen Years' Growth.

Edouard Bruel first brought forth the idea of a touring club in France, as the outcome of a visit to the Cyclists' Touring Club, in England, in 1890. From four the membership jumped to thirty, and in a few months had reached 500. The secretary's dining-room, which at first had served as headquarters, was abandoned for a separate office. In 1892 Abel Ballif, the man who has done more for the success of the club than any other person, became secretary, over a membership of 1,279. In 1893 the number was 2,951; the next year, 8,755, and in 1895 the books showed 24,923 members. From their small quarters successive removals were made to larger and larger premises, until in 1904 a move was made into the mansion at 65 Avenue de la Grande-Armée, which the Humbert family had reluctantly left for the state prison. Now it is fashionable to belong to the T. C. F., for presidents and ex-presidents honor it, heads of government departments are among its members, and every self-respecting motorist carries the club card in his pocket and the badge on his dashboard. The useful work has not suffered and the T. C. F. still does and will continue to do useful work for the automobilist.

AN ENGLISH HILL-CLIMBING CONTEST.

The third Henry Edmunds challenge trophy hill-climb, arranged by the A. C. G. B. I. took place on Blackburn Park hill, Fernhurst, on July 14. The trophy, which remains permanently in the custody of the club, was defended by the 30-horsepower Daimler of Rev. F. A. Potts, driven by C. A. Grinham. The climb was made three times, the car making the best aggregate time being declared winner. The times were not announced, however, the awards being made on points. Out of ten cars to finish the first five were English Daimlers. The trophy was won by G. Barwick's 30-horsepower Daimler, with 647 points, the defender, Rev. Mr. Potts, taking second place with 626 points. One of the first five cars was driven by a woman, Mrs. Herbert Lloyd.

INTERNATIONAL MOTORCYCLE CUP.

PARIS, July 21.—The international cup for motorcycles, which is to these small flyers what the Gordon Bennett Cup is to the big vehicles, has just been lost to France for the second time. Founded in 1904 by the Motorcycle Club of France, the cup was competed for by teams of three from different European nations and won by Demeester on a Griffon, after a hard struggle against the Austrians. Last year, on the Dourdan circuit, as before, the foreigners again came to the attack and the Frenchmen sorrowfully saw the cup carried off to Austria by Vondrichi, the rider of a Laurin-Klément machine. For a moment discouragement seemed to get the better of the founders of the cup and they refused to again enter for the event. At the last moment the René Gillet firm came forth and offered to enter three machines for the conquest of the cup. The race took place in Austria, on the Bohemian Circuit, 67 kilometers 400, to be carried four times, giving 269 kilometers 600, the road being one of the most difficult in hill climbs and turns it is possible to imagine. Four countries were represented, England, Austria, Germany, and France. The three French drivers were soon put out of the running by reason of falls, one of them breaking a few bones, another injuring his shoulder, and the third being laid up by broken wheels. Nikodem, on an Austrian Johann Puch machine, proved an easy winner at an average speed of 37.23 miles an hour. H. Collier, on an English Matchless, and Franklin, on an English J. A. P., both had to abandon on account of accidents to the machine, as had all but the following:

1—Nikodem (Johann Puch), Austria, in 4h., 36m., 12s.
2—Obruba (Johann Puch), Austria, in 4h., 51m., 47s.
3—Collier (Matchless), England, in 5h., 2m., 27s.
4—Retieme (Progress), Germany, in 5h., 17m., 41s.

A NEW TOURING CAR BODY.

PARIS, July 21.—An elegant and original type of touring car, with inside steering gear, is the one belonging to M. Cormier, Paris selling agent of the De Dion-Bouton Company. As will be seen from the illustration herewith, reproduced from *The De Dion-Bouton*, the automobile carries its engine forward under a bonnet in the usual manner, the mechanical portion of the car being in no way out of the ordinary. The space between the dashboard and the body is occupied by a specially designed light traveling trunk, strapped to

NEW INSIDE-STEERING FRENCH TOURING CAR.

two metal side arms. In this position the weight is well placed, and the trunk is protected from dust.

The carriage is entered by side doors, with glass windows letting down into pockets, and light is further provided by descending windows in front and on rear side panels. Inside is a folding table, and special provision has been made in the way of storage room for traveling necessaries. On a platform at the rear is a chest of ample dimensions, in which are carried tools and all spare parts likely to be required.

AUTOMOBILE ACCIDENTS—HOW TO AVOID THEM

By A LOOKER-ON.

MANY automobile accidents are due to an attempt to cross car tracks when two cars are approaching each other from opposite directions on parallel tracks, as in Fig. 1. Only a few days ago I observed a party turn his automobile suddenly to cross the tracks of a street railway company. He had his eyes upon car *D*, and had nearly crossed from *A*, when a car came up on the other track, from behind, striking the automobile at *C*. Fortunately, the motormen of both cars applied the brakes promptly and the careless automobilist escaped with a squeezing of his machine. The rear axle was sprung and the mud guards on both sides were broken off, while the body of the machine received severe straining. Accidents of this nature are often happening, the railway people tell me. They state that daring automobilists are frequently taking the chances of crossing the tracks at an angle, from the point *A* to *B*, without taking the trouble of glancing backward for the purpose of observing whether or not an electric car is advancing on the other track.

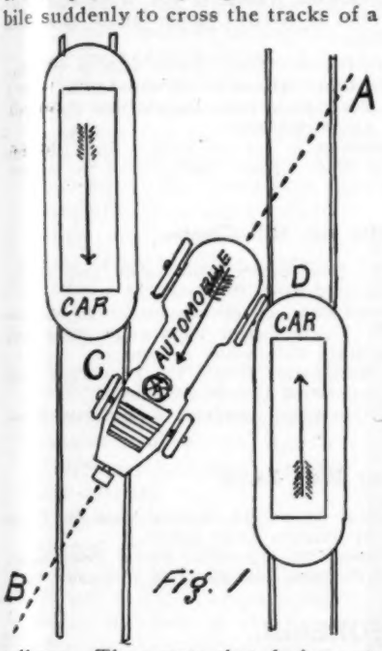


Fig. 1

Accidents are occasionally due to the excessively slippery, smooth pavements of some cities. Where asphaltum pavements are used, in the event of these pavements getting coated with a soaplike covering of moisture and slime, the revolving wheels of the automobile will often refuse to take hold. Some autoists carry supplies of sand to drop to the slippery pavements in the event of their cars getting stalled. Others get out and help the machine over the greasy spot with muscular force. As a rule the trouble is over with in a moment, and no damage is done. On the other hand, the big machines are sometimes slewed round in such way that a collision occurs. I was present, not long since, when an accident happened, caused by slippery pavements. The sketching in Fig. 2 will assist in making the necessary explanation. The car was being driven in the direction of the arrow *E* on the line indicated. It became necessary to apply the brake while the speed was fairly fast, to avoid bumping a team in front. The sudden stopping caused the rear of the car to swing around on the inclining pavement on the line of *F*. The rear wheels had taken the moisture from the wet pavement, and, though the wheels were held fast in the grip of the brake, the car was brought around with a crash against the end of a team, as at *C*. The impact threw the driver off the seat of the wagon and one of the front wheels of the wagon passed over him, doing him injury. The occupants of the automobile were uninjured.

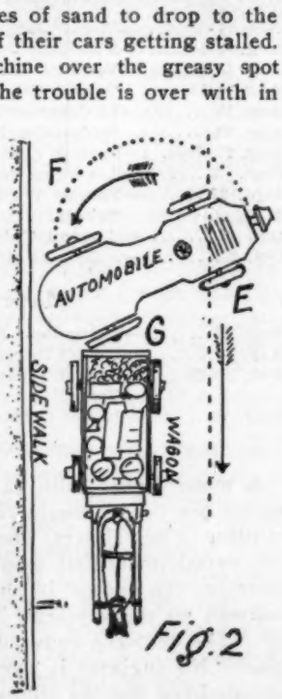


Fig. 2

Once in a while disaster comes to the automobile and its owner resulting from charitable work undertaken. A case in mind is demonstrated in Fig. 3. The owner was driving his machine out in the suburbs and met with a stalled electric car on the tracks. The crew was unable to get the mechanism of the car into proper order for getting back to the starting point. Our generous friend of the automobile offered to push the car in, and the arrangement was made, as in Fig. 3. The iron bar-link was employed to connect the automobile to the rear of the car, and all went well for a number of miles. Then it became necessary to stop and back the car to make room for a car coming in the opposite direction. In making this backing the automobile wheels caught in a track siding *K*, while the car itself remained on the straight track. The result was that the momentum of the car forced the automobile over and sprung the mechanism in such a way that the automobile was in turn hauled to the nearest repair shop. The operator escaped injury by jumping out.

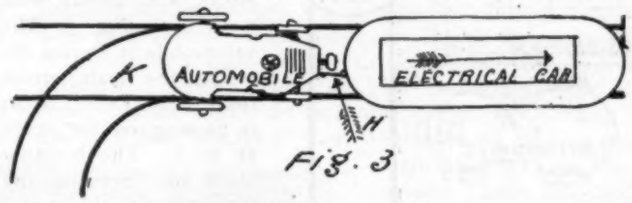


Fig. 3

Possibly the most serious accidents are due to the attempt of enterprising autoists to take the vacuum offered by a speeding electrical car; that is, there is quite an inducement to get in back of a car and run there. The car makes the way for you in crowded thoroughfares. Out in the open the car splits the wind and you get into the vacuum, and with the force of the wind gone, the riding is easier. The situation is something as shown in Fig. 4, in which the automobile is gracefully following close in the wake of the car *N*. There is not much of an interval at *M*, but the danger is not here, because the able driver is capable of stopping his machine promptly when the car stops and prevent a clash. The danger is in the fact that there is a fascinating and terrible inclination on the part of unthinking autoists to suddenly leave the track, back of the car, and cross to the other track or other side of the street.

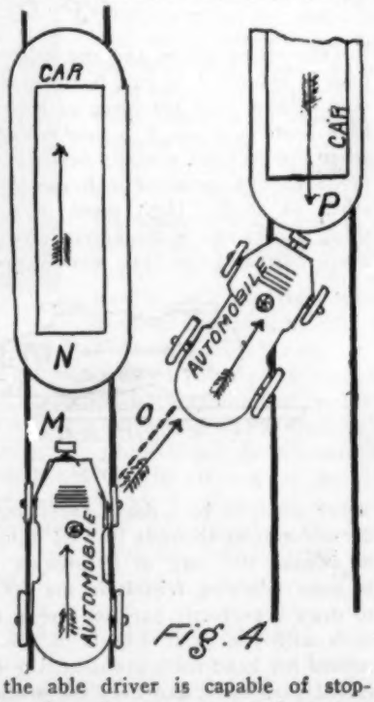


Fig. 4

Often this is done without accident. Finally, the fatal event occurs, and just as the automobile crosses from behind the car *N*, on the line *O*, another car, *B*, pops into view, coming the other way on the parallel track. There is no time to

do anything. The autoist did not see the car coming, because the rear of car *N* prevented a view of the track. Hence the collision. You would be surprised if you were given a list of the accidents daily occurring throughout the country as a result of just this move. Some of them are serious.

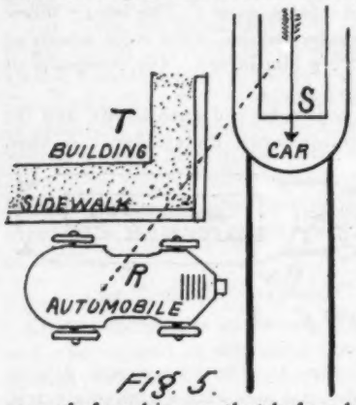


Fig. 5.

Then, again, we find that automobilists are inclined to take the chances when coming speedily out of a cross street, and collide with a car as in Fig. 5. The automobile is shown entering the main street from the point *R*. A car is passing on the track as at *S*. The building block at *T* prevents the autoist from having a full observation of the scene before him, so that before he is aware of the conditions he is in contact with the front of the car *S*. Oftentimes these collisions are slight. Then, again, there is damage done. A friend of mine has his machine in the repair shop now, because he darted into a main thoroughfare from a side street without thinking. He says he is going to have his thinking machinery in order after this. Then there is the follow the leader combination, which has likewise made good business

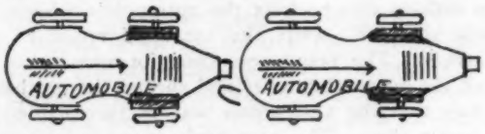


Fig. 6

for the repair shops and the setters of broken bones. This plan is exhibited in Fig. 6, for the reason that careless men who ignore rules are often appealed to with illustrations. I have heard men say it is time enough to repent and be careful when the accident actually occurs. In Fig. 6 is the time-worn mode of one automobile hugging close to the rear of the other, as at *U*. High speed is often attained. Then something occurs to the machinery of the leading car. There is a quick halt and the rear machine piles in on the front one.

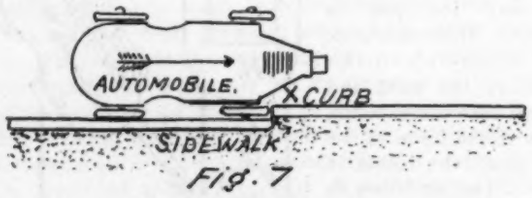


Fig. 7

There ought to be a dozen paces between the cars at least. A certain autoist thought he was doing something funny when he hugged the curg of a sidewalk one day. His object was to show admiring friends in the car how easy it was for him to draw a perfectly parallel line in the dust alongside of the curb with the right wheels of the automobile. Just as he turned his head for a moment, the front wheel struck a projected curb at *X*, and over the machine went, with the party and all.

English automobilists are rejoicing over the possibility of the speed limit being abolished, the royal commission that was investigating the subject having reported favorably to this course. Actual speed, the report states, is not of so much importance as the use of good judgment by drivers. The setting of traps for automobilists in places where a little speeding can do no harm is greatly deplored.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Tours.

Aug. 4.....—Annual Automobile Day and Parade of the Duluth Automobile Club, Duluth, Minn.
Aug. 9.....—Orphans' Day, Rochester Automobile Club, Rochchester, N. Y.
Aug.....—Annual Gymkhana Games of the Worcester Automobile Club at North Grafton, Mass. (Date to be announced.)
Sept.....—500-mile Endurance Test, Grand Rapids (Mich.) Automobile Club. (Date to be announced later.)
Oct. 1-2.....—St. Louis, Mo., Automobile Parade and Carnival, St. Louis Automobile Club.
Sept.....—200-mile Road Race, for the Farson Cup, Chicago Automobile Club. (Date and course to be announced.)

Race Meets and Hill Climbs.

Aug. 4.....—Race Meet, New Jersey Automobile and Motor Club, Weequahic Park, Waverley, N. J.
Sept. 2.....—100-mile Road Race, on 25-mile Circuit in Monroe County, N. Y. Rochester Automobile Club and New York State Automobile Association.
Sept 22.....—American Elimination Trials for Vanderbilt Cup Race. (Long Island Course probably.)
Oct. 6.....—Vanderbilt Cup Race, American Automobile Association.

Motor Boat Races.

Aug. 4.....—Buffalo, Motor Boat Club, 15-mile Race for Glasgow Cup, on Niagara River course.
Aug. 21-23.....—Gold Challenge Cup, American Power Boat Association, on St. Lawrence River at Chippewa Bay.

FOREIGN.

Shows.

Sept. 1-8.....—Canada International Exhibition, St. John, New Brunswick.
Oct. 5-14.....—Leipzig (Germany) Exhibition, Kyrstall Palast.
Nov. 1.....—New Zealand International Exhibition opens at Christchurch.
Nov. 1-16.....—Berlin (Germany) Automobile Exhibition.
Nov. 15-24.....—London, Olympia Motor Show.
Nov. 23-Dec. 1—London, Stanley Show, Agricultural Hall.

Races, Hill-Climbs, etc.

Aug. 1-15.....—Circuit des Ardennes (Belgium).
Aug. 9-12.....—Malchamps (France) Hill Climb Tests.
Aug. 15-16.....—Ventoux (France) Automobile Meeting.
Aug. 14-19.....—Ostend (Belgium) Meet.
Aug. 18.....—Liedekerke Cup Race.
Aug. 23.....—Semmering Hill Climb.
Aug. 27-Sept. 2—Brescia (Italy) Automobile Meeting.
Sept. 3.....—Auvergne Cup Race, France.
Sept. 27.....—Tourist Trophy Race, Isle of Man, A. C. of Great Britain.
Oct. 7.....—Chateau Thierry (France) Hill Climb.
Oct. 23.....—Gaillon (France) Hill Climb.

Motor Boat Races.

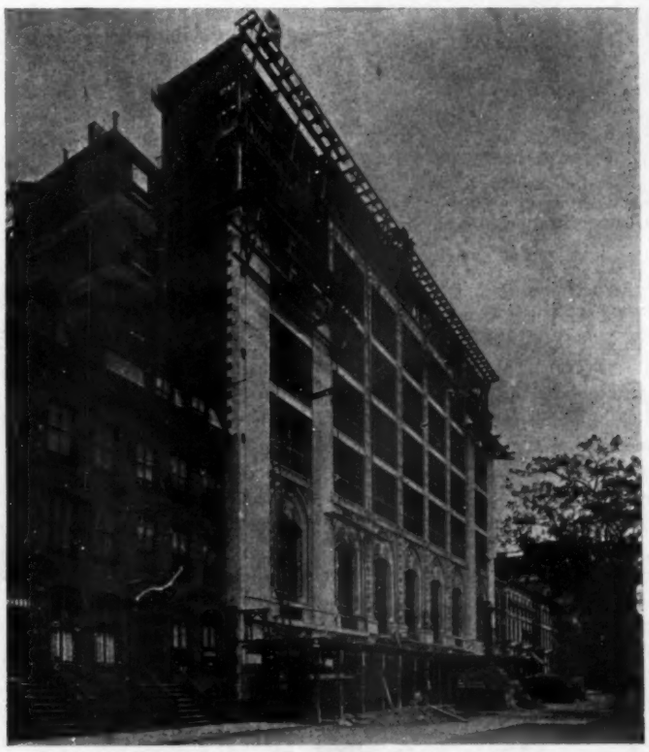
Aug. 6.....—Motor Boat Race on the Rhone (France).
Aug. 9.....—British International Cup Motor Boat Race.
Aug. 20-23.....—Ostend (Belgium) Motor Boat Races. Dover to Ostend.
Sept. 16.....—Juvisy (France) Motor Boat Meeting.

A motor barge with 24-horsepower Kromhout kerosene motor has been brought from the Goldkoop works in Amsterdam to the Thames, where it is now plying. The speed of the vessel under full load is eight miles an hour. When starting, the motor is supplied with gasoline, but when warmed up the kerosene is turned in and the gasoline cut off. The kerosene consumption is given as two gallons per hour. No engineer is required, it is said, the motor being so simplified that the ordinary crew can attend to it.

MIDSUMMER KEEPS AUTO CLUB MEN BUSY

Structural Work on A. C. A. Clubhouse Completed.

A very good idea of what the new clubhouse of the Automobile Club of America will look like from the front when finished is obtainable now that all the walls have reached their full height and the glazed terra cotta and brick facing has all been placed. The accompanying photograph shows the stage which the work had reached by Saturday, July 28. Only a few days before that the placing of the last piece of structural steel in the skeleton was made the occasion for a celebration. In addition to raising an American flag and a branch from a green tree at the topmost part of the structure, in accordance with the time-honored custom founded on the superstition that they will bring long life and prosperity, there was a presentation of mementoes to the force of 200 workmen who attended a dinner given them by the Automobile Club at the Cumberland Hotel. Major E. M. Fenn, superintendent of construction, acted as toastmaster, and in his introductory remarks wished the club a prosperous occupancy of its new quarters.



HOW THE A. C. A. CLUB HOUSE LOOKS TO-DAY.

It is hoped that at the present rate of progress, the clubhouse will be completed next fall and that it will be occupied before the first of the year. Although the exterior work is well advanced, the wood finishing inside has not been begun, the concrete floors having just been laid. Interior decoration and furnishing of the many rooms will not be fully decided upon until the house committee meets later in the summer; the chairman of the committee is now in Europe and is not expected back for another month.

On its somewhat obscure site on Fifty-fourth street, between Broadway and Eighth avenue, New York City, the eight stories of the big new structure loom up prominently above the adjoining brownstone residences. It is by far the largest structure built in America for occupancy by an automobile club. It is of very substantial and fireproof construction with ample room for the accommodation of the club garage, storage room and repair and testing departments, in addition to the assembly-room, library, grill-room, billiard-room, offices, committee rooms, and other apartments demanded by the size and activity of the organization. The front of the building is very ornate with its large, round-topped windows and ornamental facing of terra cotta molded into shields draped with garlands in light green and blue colorings against a buff ground.

With many of the most active members touring abroad or out of the city, the clubrooms are a dull and quiet place during the summer months, but the coming fall and winter promise to be the most active and important in the history of the club. Besides the labor involved in furnishing the new clubhouse and moving into it, the club is scheduled to hold a contest of commercial vehicles and an alcohol fuel competition during the fall, to be succeeded in the middle of the winter by another annual automobile show that is to be even larger and better than the exhibition held last January in the Fifty-ninth Regiment Armory.

Residents May Try to Prevent Rochester Road Race.

ROCHESTER, N. Y., July 31.—Members of the Rochester Automobile Club and other auto enthusiasts in this vicinity are considerably wrought up over the difficulties which some of the residents in the towns, through which the course for the Labor Day race will be run, are trying to put in the way. First, County Engineer McClintock came out in opposition to the race, as stated in a recent issue of THE AUTOMOBILE. During the absence of the county engineer from the city the Rochester Automobile Club circulated a petition among the highway commissioners of the towns through which the race will be run, and obtained their consent. Now several of these commissioners have succumbed to an attack of cold feet and announce their intention of withdrawing the permit; further, a few residents of Rush have come out in open opposition to the race on the ground that it is a great injustice to rural residents to have the highway closed to traffic for the greater part of the day. While no definite information could be obtained, it is persistently rumored that these residents will apply for an injunction to stop the contest.

Notwithstanding all these difficulties, the officers of the club are going right ahead with their plans for the race. Several more entries have been received, and many out-of-town enthusiasts have signified their intention of coming to witiness the race.

The Rochester Automobile Club will, on August 9, treat the orphans of this city to an outing. A committee to take charge of the run was appointed at the last annual meeting, consisting of Wm. C. Barry, Jr., chairman; Griff D. Palmer, F. E. Mason, A. J. Rockwood and George W. Kirkpatrick. The cars will assemble at Plymouth avenue, near the headquarters of the club, and will then form into a parade with the park band at the head. The parade will pass up Main street, where it will be reviewed by Mayor Cutler. The children will then be taken about the city, and later to Seneca Park, where it has been planned to serve them with cake, ice cream and other refreshments. The band will also give a concert. The children will then be taken back to the city in time for supper.

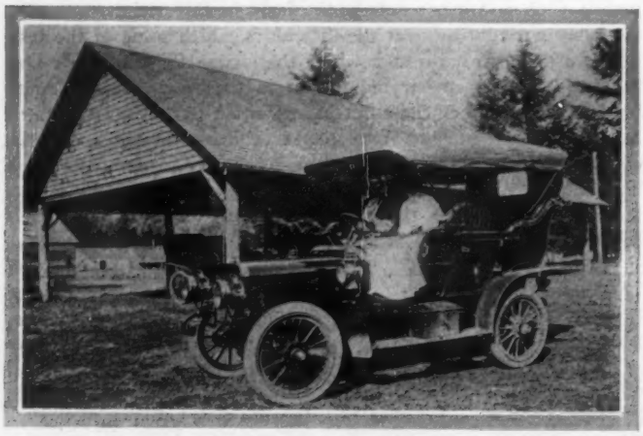
Washington A. C.'s New House is Popular.

WASHINGTON, D. C., July 30.—The new country clubhouse of the Automobile Club of Washington, the opening of which was chronicled in last week's issue of THE AUTOMOBILE, is the most popular automobile resort in Washington. Every evening the spacious verandas are thronged with club members and their lady friends. President Duvall has announced the house committee, as follows: Louis Willege, chairman; Frank Henry, vice-chairman; and Messrs. Mark, Caverly, Daniel, Smith, Faulkner, Spencer, Heyl, West, Johnson, Clinedinst Adams and Copenhaver.

A boom in club membership is bound to result from the opening of the new house.

Autos the Leading Feature at Tacoma Country Club.

TACOMA, WASH., July 27.—During the present season the automobile is playing an important part in club life at American Lake, where the Tacoma Country Club has its home. At the opening of the clubhouse this summer most of the members made the trip out and back in their cars. Every Sunday cars are continually



AT THE AUTO SHED OF THE TACOMA COUNTRY CLUB.

Mrs. W. O. Williams and Mrs. Paul Gyllstrom in front of auto shed in a Winton Model K.

scurrying up to the house, and for the accommodation of which a very large shed has been erected. This shed lies close to the road and can be entered from any side, as it is open, consisting only of the roof and pillars of native fir.

This is the first year that the automobile has come to be an important matter in the life of the club, and it now appears quite indispensable. The distance to American Lake from the city is twelve miles and over an excellent stretch of prairie roads, most of them being as good as can be found anywhere. The distance is usually negotiated in 45 minutes, although when some of the drivers close their eyes to the speedometer and their consciences to the law, they make it in about half an hour. Because of frequent turns in the road, however, the careful ones do not try to establish any records between the two points.

This clubhouse is destined to play an important part in touring in this vicinity when the road to Mount Tacoma has been completed. The road shown in the picture will be a part of that great tour, and naturally the clubhouse will become a resort for Tacomans and others that come here for the special purpose of enjoying the unusual automobile advantages that a few years hence will afford.

Worcester Has New Garage Building with Club Rooms.

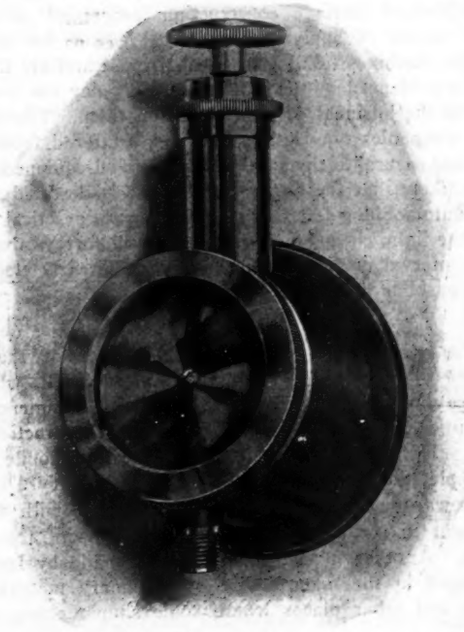
WORCESTER, MASS., July 31.—This city is to have one of the finest garages in New England which only Boston's big motor mart will excel; in fact, is to be built on much the same lines as the Hub's big garage. Fred S. Taylor, an automobile enthusiast, who owns a number of cars and who is a charter member of the local automobile club, is at the head of the movement. The plant will be controlled by a Massachusetts corporation. Plans are now nearly finished and work will be started inside of ten days. Mr. Taylor, who is a satinet manufacturer with big mills in Charlton, does not care to talk very much about the plans of the promoters. There will be 6,500 feet of floor space in the building, which is to be two stories in height and of brick construction. Three sides are to be of glass, while the promoters are seriously considering having all four sides made of heavy plate glass. The location seccured is in the heart of the business district in the center of the city. There is not another garage so centrally located.

There are to be large quarters for another automobile club. This announcement has revived the talk of the formation of another club here, one which will be only for automobilists, and which will not have any social privileges, such as the present automobile club has. It is even hinted that the new Hermitage Club may occupy the new quarters for town rooms, but those connected with the new venture and with the club deny any such intentions.

HOW THE AUTOMOBILING MEMBERS OF THE TACOMA COUNTRY CLUB HAVE BECOME THE DOMINANT ELEMENT.

A NEW TANK INDICATOR.

The importance of knowing how much gasoline remains in the tank of an automobile, especially on long trips, has led manufacturers to place on the market a number of indicating devices, making unnecessary the rough-and-ready process of unscrewing the filling cap and poking a stick into the tank to measure the depth of the gasoline. The probability of introducing dirt into the tank is also against this timehonored makeshift. The latest tank indicator is known as the Tankoscope, and is manufactured by the Boston Auto Gage Company, of 614 Old South Building, Boston, Mass. It consists of a dashboard indicator, as shown in the accompanying illustration, connected with the gasoline tank by a small tube. On the top of the instrument is seen a milled knob, surmounting a polished metal column. By moving this knob a small quantity of gasoline is drawn from the tank into the indicator, and this always bears a definite ratio to the quantity in the tank. The gauge is graduated to read in gallons and fractions of a gallon, so that the quantity on hand can be seen at a glance. When the driver has satisfied himself as to how much of the liquid he still has, he releases the knob and the gasoline in the indicator and the pipe returns to the tank. It is not necessary for the driver to leave his seat; he can easily reach the knob and measure his fuel from where he sits.



THE TANKOSCOPE.—A NEW TANK INDICATOR.

Tankoscopes are made for tanks in which air under pressure forces the fuel to the carbureter, and also for atmospheric pressure tanks. The instruments can also be used in motor boats and can be placed in any part of the boat, no matter where the tank may be located.

MR. MALCOMSON STATES HIS POSITION.

DETROIT, July 28.—Alexander Y. Malcomson has positively denied the current report that there was friction between him and other officials of the Ford Motor Company, of this city, either before or after he severed his connection with that concern. As for his reasons for disposing of his holdings in the Ford company, Mr. Malcomson stated that he received an extremely tempting offer for his stock and that, in addition, he welcomed the opportunity to turn all his attention to the affairs of the Aerocar Company, of which he is president and general manager.

Mr. Malcomson regretted that erroneous rumors regarding the alleged strained relations with his old business associates should have got into circulation, and in denying them absolutely he paid a high tribute to Henry Ford.

DETACHABLE SEAT FOR RUNABOUTS.

There are many occasions when the owner of a single-seated runabout, with its capacity for two passengers only, would consider an extra seat for a couple more passengers a convenience of no small magnitude. Often four persons can be carried even by a very light car, as when running quietly around on level roads, where the capacity of the machine is but slightly taxed, or when it is desired to load up with children whose weight is light. To fill this want a detachable seat has been brought out by the Fellwock Roll and Panel Company, of Evansville, Ind., made to fit the principal makes of runabouts now in use. The manufacturers state that this handy seat, which is illustrated herewith, can be attached in three minutes and removed in half that time. It is finished to match the color of the car for which it is ordered, and does not detract from the good appearance of the machine to which it is attached.

DETACHABLE EXTRA RUNABOUT SEAT.

A TEST FOR THE 1907 PACKARD.

Henry B. Joy, general manager of the Packard Motor Car Company, arrived in New York last Friday after a most successful run over the roads from the factory in Detroit in a new 1907 model Packard car. The purpose of the run was to test the new model on the roads. Mr. Joy left Detroit on Tuesday at 6 o'clock and arrived in New York the following Friday at 6.30. The run from Detroit to Buffalo by way of Niagara Falls, 302 miles, was covered in exactly twelve hours. Mr. Joy states that during the entire run he had no troubles of any kind. The car was fitted with 4 1-2-inch Diamond tires on the rear wheels, and 4-inch on the front, and Mr. Joy did not have occasion to touch them on the entire run. The new model is rated at 30 horsepower and, it is claimed, will develop 60. Its price will be $4,200. During the week the new model will be on exhibition at the New York branch.

GENERAL MANAGER JOY IN 1907 PACKARD, 30-H.P

The AUTOMOBILE

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A Contest Cannot Be a Pleasure Tour. It is one thing to conduct a strictly run contest for a trophy and quite another to promote a pleasure tour. That the two could be successfully combined was questioned before the Third Annual A. A. A. Tour started from Buffalo. Now that it is over there are many who have no doubt on the subject, among them none other than the chairman of the committee which planned and managed the event primarily held for the possession of the Glidden trophy.

Much good advertising will fall to the American industry as a whole resulting from the excellent showing of the automobiles which participated in the trying tour from Buffalo to Bretton Woods. Unmistakably emphasized were the sturdy qualities of these travelers over roads that frequently were such only in name, for they climbed apparently impossible grades, bumped a hundred times a day over water breaks, and ploughed through sand inches deep.

But the struggle for a trophy requires hard and fast rules and observers to see that such restrictions are faithfully complied with. Furthermore, a much better plan than the one of time penalties for repairs and replacements is needed. The essential parts of an automobile, if replaced, should bring stipulated discredit marks; and since the maker has nothing to do with the tires that are worn to shreds on our indifferent American highways, this form of trouble should not be charged except in very minor degree against the car.

But the most transparent deduction of the tour just ended is that a serious contest wherein so much is involved cannot be linked with the journey of a party of pleasure seekers.

Survival of the Horseless Carriage. Despite the ridicule directed at it, the "horseless carriage" idea has persisted through the years that have seen the Continental type of gasoline car brought to its present state of perfection and predominance. Such epithets as "shaftless buggy," and the ill-concealed contemptuous refusal of automobilists to accept the products of their experiments as worthy of serious consideration, failed to swerve a number of Middle Western men from their faith in a field for a type of power vehicle constructed especially to suit certain conditions in the West that do not prevail in the Eastern United States nor in Europe.

Quietly but steadily they have worked along lines of their own selection, keeping always in view the necessity for extreme simplicity, low cost, light weight, durability and high clearance above the ground. They began with the assumption that the carriage builder, after many years of study and experience, had evolved the most suitable type of horse-drawn vehicle for that territory, and, without endeavoring to improve on the fundamental principles of carriage construction, proceeded to work out the best means of applying mechanical power for propulsion.

That the machines fulfill a practical purpose and are in constant demand is evidenced by the number in every-day use and the expansion of the business of manufacturing them. There are half a dozen companies now in the business, scattered from Ohio to Kansas, and several of them have new and well-equipped factories. It seems likely that the buggy type of car is destined to fill the niche in automobiling left almost vacant by the practical abandonment of the light, cheap steam runabouts and surreys that bridged over the interval in development between the early electrics and the later gasoline cars.

Alcohol Motors and Fuel Supplies. Since the passage of the Federal denatured alcohol bill, which goes into effect January 1, 1907, there have been commenced many separate and independent investigations into the practical use of this fuel. Not all of these are within the automobile field, as, for example, the investigation begun by the Navy Department looking toward use of the fuel in power boats, with a possible development in the direction of use in vessels of the torpedo-boat type. Another investigation is being made by large interests engaged in the manufacture of stationary motors for use on farms and other places where some simple prime mover is required.

There is room for much investigation and experimentation, however, in the automobile field, and the development of the alcohol motor is worth the serious consideration of the builder of motors of the automobile type, whether for use in cars or in boats. It is true that the work will have to be done from the ground up, as it were, for the literature on the subject is not extensive and data as to dimensions and proportions practically unobtainable.

It is not clear at the present moment just where the supplies of this fuel will come from immediately after the tax is removed, but it can safely be taken for granted that those now engaged in the distillation of spirits will endeavor to keep pace with the earliest demands. Should the latter exceed existing facilities it would not be long before independent distilleries would be started in many new locations where any scarcity of the fuel existed.

The distillation of a non-potable spirit is a comparatively simple matter and does not require the special skill needed in rectification and blending of spirits to be used for drinking. It is not without the bounds of future possibilities to imagine a large automobile works equipped with a small distilling plant as a part of the regular equipment for engine and car testing. Those factories situated close to farming country would at any rate be in a position to secure cheaply the raw materials. And in small communities the automobilists might readily club together and establish a distilling plant, which would not only supply them with fuel, but with an illuminant that has many advantages over kerosene oil. Probably the only real difficulty would be in arranging for the supervision of such plants by the U. S. revenue officers.

CRAWFORD NOTCH CLIMB.

BRETTON WOODS, N. H., July 31.—Postponed from yesterday because of rain, the Crawford Notch climb took place this morning to the accompaniment of radiant features. The climb of the Notch is difficult and dangerous, and the upward jolting journey proved too strenuous for several cars. The bulk of the honors went to the 1907 Stearns cars, one piloted brilliantly by Guy Vaughan, and the other equally well handled by A. E. Morrison, the Bostonian, who excelled in the Mount Washington event two years ago. Vaughan appropriated the free-for-all and heavy weight events at one swoop. None being left to oppose him, his figures of 2:48 for the 1.42 miles ascent were the fastest of the day. The Columbia, which went through the A. A. A. tour with a perfect score, gave proof of its ruggedness by winning an event, the capable Barrett being at the helm. Another year it is probable that the Climb to the Clouds up Mount Washington will be resumed. Crawford Notch is not a satisfactory substitute for the more spectacular event, and while the name may not be the only reason, the climb of the dim dome of Mount Washington seems to carry much more prestige. Manager W. J. Morgan believes a satisfactory arrangement can be made next year for the 8-mile road to the Summit House. To-day's summary follows:

FREE-FOR-ALL (STRIPPED AND RACING CARS).

1. Stearns, 45-h.p.; driver, Guy Vaughan..... 2:48

HEAVYWEIGHT CLASS (ALL MAKES).

1. Stearns, 45-h.p.; driver, Guy Vaughan..... 2:48

STOCK CARS COSTING BETWEEN $4,000 AND $5,000.

1. Stearns, 45-h.p.; driver, A. E. Morrison..... 3:04
2. Stearns, 45-h.p.; driver, Guy Vaughan..... 3:08 4-5
3. Columbia, 40-h.p.; driver, J. C. O'Brien..... 3:37 4-5
4. Columbia, 40-h.p.; driver, A. E. Cope..... 4:01

This event was protested by a representative of the Electric Vehicle Company on the ground that the two Stearns cars were not stock cars according to catalogue, the fact being that the Stearns company has not as yet issued its 1907 catalogue. Referee Speare sustained the protest and disqualified the two cars. An appeal may be made to the racing board of the A. A. A.

STOCK CARS COSTING BETWEEN $3,000 AND $4,000.

1. Packard, 24-h.p.; driver, G. O. Draper..... 3:42

STOCK CARS COSTING BETWEEN $2,250 AND $3,000.

1. Columbia, 24-h.p.; driver, C. F. Barrett..... 3:46 4-5
2. Rambler, 35-h.p.; driver, H. E. Wilson..... 4:00 3-5
3. Knox, 30-h.p.; driver, H. Jones..... 4:02 4-5

STOCK CARS COSTING BETWEEN $1,770 AND $2,250.

1. Olds, 28-h.p.; driver, F. Allen..... 3:59 4-5
2. Crawford, 24-h.p.; driver, R. Crawford..... 4:01 2-5

STOCK CARS COSTING BETWEEN $1,200 AND $1,750.

1. Premier, 24-h.p.; driver, G. Brettenden..... 4:01
2. Crawford, 24-h.p.; driver, W. Roswell..... 4:18 4-5

STOCK CARS COSTING BETWEEN $850 AND $1,200.

1. Stanley, 20-h.p.; driver, H. E. Roger..... 3:11 2-5
2. Buick, 22-h.p.; driver, H. J. Koehler..... 4:00

The exodus from Bretton Woods began Monday morning, and by nightfall many had gone. The Bay State tourists remained for the climb, and to-morrow will resume their tour, going to Portland, where the local club will provide entertainment. Failure to supply personal invitations to the banquet last night at the Mount Washington resulted in a meager attendance. Vice-president Speare presided, and other A. A. A. officials graced the occasion. Governor McLean welcomed the automobilists and "Globe Girdler" Glidden was another interesting speaker. In the afternoon Mrs. Glidden gave a tea to the ladies who had made the long journey. To-morrow morning there will be nothing left hereabouts relating to the third annual tour except mixed recollections of gasoline odors, begoggled beings departing, and a thankfulness that the cavalcade had no accidents on the mountain roads.

THE BAY STATE ANNUAL TOUR.

BRETTON WOODS, N. H., July 30.—The members of the second annual tour of the Bay State Automobile Association of Boston, accompanied by a few members of the New York Motor Club, arrived here on schedule time last Friday afternoon. In the party were twenty-six cars, the original fourteen that started from Boston Thursday morning having been augmented along the road. The tourists reported good roads and a pleasant run, lacking in incident. Thursday noon a stop was made at the Kearsarge House at Rye Beach for luncheon, and in the early afternoon a ball game was played between a picked team of the Bay State Automobile Association and the hotel team. The automobilists were beaten.

Thursday night the party stopped at Newcastle, and to-day the tourists pushed through to Bretton Woods, stopping at Intervale for luncheon. C. H. Larson with an Oldsmobile was pilot on the first day and J. H. MacAlman in his Columbia led the way to-day. When nearly here Roy A. Faye's Thomas caught fire, but the blaze was extinguished without great damage. Among those on the tour were A. L. Kull, of New York, and party in a Wayne. Others were Dr. H. B. Metcalf, Buffum; W. R. Noone, Thomas; G. C. Squire, Premier; Mme. Ella Des Roehers, Franklin; W. H. Sullivan, Welch; C. H. Morey, White; H. D. Church, Peerless; L. R. Speare, Winton; Morgan Kent, White; H. E. Rogers, Stanley; Albert Davis, White; R. C. Stevenson, Locomobile; Wm. Gray, Locomobile; Robert Damon, Pope-Toledo; J. C. Prouty, W. E. Myrick, J. S. Hathaway, and B. A. Price, all Whites.

THE ANNUAL A. A. A. TOUR FOR THE GLIDDEN AND DEMING TROPHIES FINISHING AT BRETTON WOODS, N. H.

PERCY PIERCE SMILINGLY SHOWS HIS RABBIT'S FOOT

FRANK E. WING IN HIS MARMON AT THE FINISH.

INCIDENTS OF THE INTERNATIONAL TOUR

TIRE trouble was the only thing that prevented the following cars from having perfect scores: Wallie Owen's Cleveland, H. K. Sheridan's White and N. H. Van Sicklen's Apperson.

Archie Hughes, of the Foss-Hughes Company, Philadelphia, Pierce agents, said: "I've enjoyed the run, particularly so because my car went through with a clean score. I think I can be counted on again."

Birmingham, the mechanic on the Pardee Packard, lost a finger while trying to adjust the magneto when the car was running on the way from Saratoga to Elizabethtown, and the time lost in taking him to a doctor and having the remainder of the finger amputated and the wound dressed resulted in the car being fifteen minutes late.

Probably the worst luck befell Ezra Kirk with his Thomas car, for he was two minutes late at the finish of the entire trip. With not a point scored against the car, a broken chain at the last control lost a little time, but this was soon made up. Going into Bretton Woods, however, he delayed too long getting flags at the Mt. Pleasant and arrived at the Mt. Washington Hotel two minutes too late.

The tire men on the route had their periods of happiness and depression. "Diamond" McCrea, from Akron, O., was one who never seemed to be out of sorts; "Goodrich" Rutherford, of the Buffalo branch, naturally enthused at the showing in the "13" list; "Continental" Rutz, from New York, was in evidence; and Warren T. Walker, of the Pennsylvania Rubber Company of New York, took the trip.

Arthur Holden lost three points with the Stearns, because his mixture wasn't just right on the hills going to the border control. R. M. Owen, with his Oldsmobile, lost time on Schwartz Hill when other cars blocked his way and subsequently lost three points putting in a spring. The Abbott Oldsmobile had tire trouble and Maxwell Hart's Corbin car lost its points by being unable to get by stalled cars on Schwartz Hill.

Running into a ditch that bent his axle prevented James Becker's Elmore from having a clean score, while E. R. Lozier's Good Samaritan acts in helping others out, lost him points for the Lozier. S. B. Stevens, who was charged fourteen points, lost them in an exasperating manner. A miscalculation of time going through Rouse's Point caused him to arrive seven minutes ahead of time, and this cost him the points that prevented a perfect score.

By the time Rangeley Lake was reached, Mr. Glidden was willing to admit that it would be difficult to work out rules to meet his theory of a pleasure tour combined with a contest. He suggested off hand that it might be better to make it purely a pleasure tour, with a given destination each night, but no strict schedule, and then let all those who were in at the finish draw lots to see who should keep the trophy for a year as a memento of the trip.

Waterville is a Maine town which contains many open-handed and generous folk, in the opinion of the A. A. A. tourists, who were entertained royally and received with true Down East warmth. The Canibas, Elks, Masonic, and Taconnet clubs kept open house, and a ball game, band concert, and theater party were included in the doings of Wednesday, July 25. Maine is prohibition, but in some manner those who were athirst secured that for which they yearned. As in other towns, flags waved in plenty.

The Morrison party from Boston filled a car that was included in the pleasure division. Mr. and Mrs. J. W. Morrison, Miss Morrison, and Miss Sullivan composed the Bay State contingent, and they took no heed of checks or schedules in their traveling. Between Waterville and Rangeley tire trouble first delayed, and then mechanical "incidents" compelled them to halt at a farmhouse some twenty miles from the designated night stop. Tom Fetch went to the rescue early the next morning.

In the early stages of the tour W. W. Burke, manager of the New York branch of the Electric Vehicle Company, lost three points through his timer not clocking with that of the checker. Otherwise his score was clean up to the concluding day. One of his passengers, a newspaper man, had the misfortune to turn an ankle while trying to lead a scared horse past the Columbia. The injury was so painful that it became necessary to stop and obtain medical aid. Of course this put the car minutes behind at the first checking station, and then Mr. Burke dropped out of the game.

Always interested in touring matters, the White standard was much to the fore in the fortnight. The steam contingent at various times included Windsor T. White, the head of the

company; Walter C. White, who drove one of the confetti cars and had the misfortune to be ditched on the last day because of an unruly horse occupying too much of the road; Carl H. Paige, manager of the New York branch; Harry Greece, the Detroit manager; Webb Jay, the Chicago manager; E. C. Johnston, of the Philadelphia branch; Watson Coleman, of the Lynn, Mass., branch; and R. H. Johnston, the advertising manager.

Sainte-Marie-de-la-Beauce was a Canadian town, which on Tuesday, July 24, gave the passing cavalcade the most enthusiastic attention of the entire tour, and the route through all Quebec was tinged with the exuberant expressions of the French inhabitants. Sainte-Marie took a holiday that was not down on the calendar, and she did herself proud. Fruits, flowers, and candies were showered into the cars, and those who slackened pace profited by so doing. The male contingent was proffered kisses in messages and by hand, and some were inclined to linger and test the genuineness of this prodigality.

Going from Utica to Elizabethtown, and from there to Champlain, through the woods, the tourists found several pieces of newly-made State roads, and realized that with the big appropriation made under the new good roads bond issue, the whole State will afford fine touring within a few years. When they got into the wilds of Maine, however, and drove from Jackman to Waterville, traveling through the woods for ten miles at a stretch without seeing a house, they marveled more and more to find splendid roads where no one lived, and after having found the worst going of the whole trip in the populous district of central New York.

So rapidly did the local color shade and brighten, and so rapidly did the scenes and incidents multiply throughout the tour that at the end of the day the effort to recall its incidents was as an attempt to recollect the figures of a kaleidoscope seen a week ago. Usually it was impossible to make notes in the bouncing car, and at night those who rode together would ask one another: "Where was it that we saw the Blank car, and where did we get lunch?" This confusion of mind, due to flying scenery, physical fatigue, mental strain and rapid flitting from place to place, resulted in the question: "What day is this?" becoming very frequent.

Judge James B. Dill, of East Orange, N. J., is a summer resident of Maine, and his early automobiling in the Pine Tree State unquestionably brought about the Montreal-Quebec-Rangeley part of the 1906 route of the A. A. A. tour. Judge Dill and family occupy a cottage at Rangeley Lake, but the Judge spends considerable time at his cabin, some fifteen miles back in the woods. The Touring Committee, of which Judge Dill is a member, held its Rangeley Lake sessions at his cottage, where all the tourists were made welcome. The day of rest at Rangeley was one of the delightful recollections of the tour, and, of course, a crop of fish yarns was a natural sequence.

N. H. Van Sicklen, the Apperson entrant, had possibly the most exasperating experience of the tour. His son, Charles, drove the car, the owner industriously filling the role of mechanician, and with them were Mrs. Van Sicklen and the Misses Griffiths. From Chicago to Buffalo, Car No. 1 was true to its name, and then it entered the list of Glidden Trophy candidates. It continued first out and first in every day until a series of tire troubles on the eleventh day of the run from Waterville to Rangeley, delayed it eleven minutes, which, of course, meant a discredit of eleven points. Father and son, with no factory assistance, struggled pluckily against the tire bugaboo, but the fates were against the Chicago Automobile Club representatives, and they lost their clean score. The increase of checking points had brought about the disaster, which possibly was more mournfully accepted by the trio of women than by the tired men.

S. B. STEVENS SMILES CHEERFULLY AT THE FINISH.

WILLIAM E. WRIGHT IN HIS WATERLESS KNOX

JOS. M'DUFFEE OF CHICAGO IN STODDARD-DAYTON.

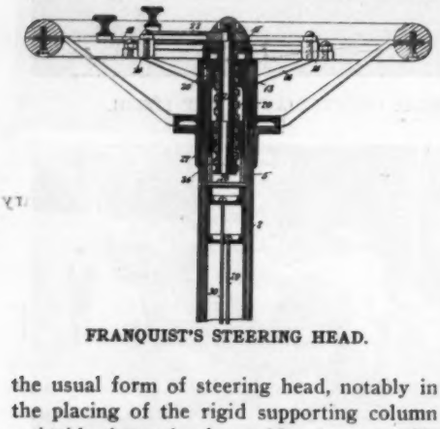
CHAS. F. BARRETT'S COLUMBIA ARRIVES AT BRETTON WOODS.

Patents

Steering Head.

No. 825,593.—G. E. Franquist, of New York City.

This steering head differs from the ordinary form in that the spark and throttle control levers are not mounted on the steering wheel and therefore do not rotate with it. This involves a departure from



FRANQUIST'S STEERING HEAD.

the usual form of steering head, notably in the placing of the rigid supporting column *5* inside instead of outside the rotatable sleeve *2*. Above the bearing provided between *5* and *2* at the top, is a spider with hub *13* secured to *5* and spokes *14* supporting toothed segments over which the levers *18* and *22* move. Of these levers, *22* is attached to the shaft *31*, carrying the steep pitch screw *24*. The other lever is secured to a sleeve *17* connected to the screw *20*. On each of these screws slides a nut *26 27* formed at the end of a sleeve, and these sleeves are slotted to be held against rotation by the pin *28* in *5*, consequently these rods and sleeves move up and down only and therefore actuate the vertical connecting rods *29* and *30*.

Engine Control System.

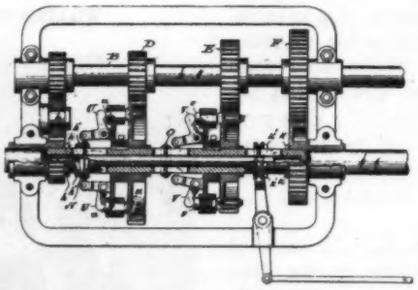
No. 825,531.—G. E. Franquist, of New York City.

This is a system of governor control, combined with means for regulating the governor by means of a lever on the steering wheel, and an accelerator pedal for putting the governor out of action entirely. In the drawing, *29* indicates the throttle, which is opened by moving to the left from the position shown. It is operated by the arm *37*, to whose rockshaft *35* the arms *36* and *38* are connected. Assuming that the throttle is opened, an increase in the speed of the engine causes the lever arm *17* to move to the right by expansion of the centrifugal governor. This movement permits *38* to move downward, thereby relaxing the compression spring *63*, which is held between the adjustable nuts *66* and the lever *64*, which may be rocked to any position desired by a lever on the steering wheel. The effect of rocking *64* so as to compress *63* is to make the throttle close more easily under action of the governor because the springs *63* and *15* are in opposition. The effect of depressing the accelerator pedal *46* is obviously to open the throttle forcibly regardless of the position of the governor.

Speed-Changing Gear.

No. 825,815.—S. E. Farnham, of Racine, Wis.

This system resembles the sliding gear system in that a flywheel clutch is necessary, which must be released before the change of gear is made. It resembles the individual clutch system in that the gears are constantly in mesh. The clutches take



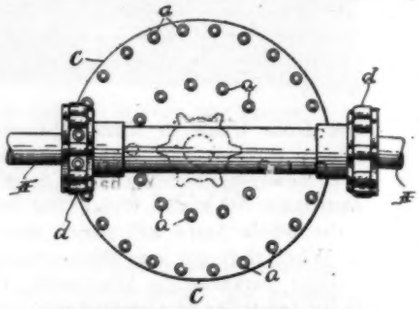
FARNHAM'S SPEED CHANGING GEAR.

the form of square pins *u p*, which are forced by the spreaders *N O* and bell cranks *U V* to project so as to go into engagement with lugs secured to the driven gears. The shaft *B* is the driving shaft, and motion is transmitted directly through the several gears for the different speeds. For the high speed the clutch *k k'* is engaged, and for the reverse the claw clutch *h h'* is engaged. The claw clutches and spreaders are operated by a sliding rod, passing through the driven shaft.

Changing Gear.

No. 824,110.—W. E. Golden, of Detroit, Mich.

This is a device in which the driving shaft *A* carries a pair of pinions having roller teeth *D*, which engage roller teeth *A A* on a driven disk *C*. The changing



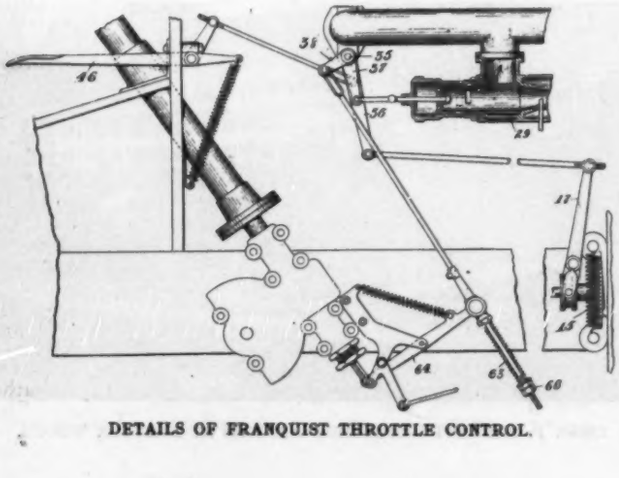
GOLDEN'S CHANGE SPEED GEAR.

velocities of the teeth while in contact are taken care of by the rollers, and a change of gear is accomplished by sliding the pinions on *A* to engage one or another set of roller teeth on *C*.

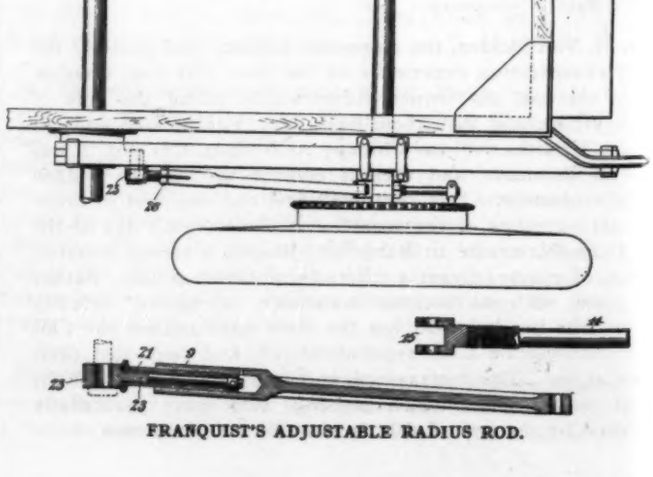
Radius Rod.

No. 825,594.—G. E. Franquist, of New York City.

The ordinary radius rod is adjusted by a turnbuckle, and the two ends of the rod may turn relatively to each other by the turning of the threads in the turnbuckle if the latter is locked only at one end. In the present invention special provision is made for turning independently of the screw adjusting means. This provision consists in making the shank *23* rotatable inside the threaded adjusting sleeve *21*, which is preventing from turning in *9* by splitting and clamping the latter. The rear end of the rod is pivoted in the fork *15*, and the rear end of the fork may be utilized, as the drawing shows, as a means for the support of the brake shoes.



DETAILS OF FRANQUIST THROTTLE CONTROL.



FRANQUIST'S ADJUSTABLE RADIUS ROD.

NEWS AND TRADE MISCELLANY.

John Wilkinson, engineer for the H. H. Franklin Mfg. Co., accompanied by F. J. Haynes, factory superintendent, attended the meeting of automobile engineers held in Detroit last week.

W. S. Daniels, who has conducted the Michigan Automobile Company at Grand Rapids, Mich., for a number of years, has sold the enterprise to the Buick-Johnson Company of Flint, Mich.

Mayor Tom L. Johnson, of Cleveland, O., has purchased a Ford six-cylinder 40-horsepower car which he uses for pleasure trips and for business runs, inspecting railroad building operations.

The Continental Caoutchouc Company, of 43 Warren street, New York, states that the first ten cars in the recent Henry Edmunds Trophy hill-climb in England were equipped with Continental tires.

The H. H. Babcock Carriage Company, of Watertown, N. Y., has arranged to take up the manufacture of automobile bodies for the trade, and it is stated that many orders have already been booked.

The automobile business in Tacoma, Wash., is badly handicapped for want of expert mechanics. There are not a great many openings, but even they cannot be filled. The average pay is 40 cents an hour.

The National Body Company, of Pontiac, Mich., which recently removed to that city from Mt. Pleasant, Mich., is now getting in shape to do business. The plant is located in the vehicle factory formerly occupied by C. V. Taylor as a carriage factory.

The Michelin Products Selling Company, Inc., states that the parent Michelin firm controls the patents on the detachable rims that have been used with such success in recent French races, and that the rims will be on sale in this country within a few months.

Alcohol engines will be placed on the market, as soon as the bill removing the tax from denaturized alcohol becomes effective, by the Witte Iron Works Company and the Weber Gas and Gasoline Engine Company, both of Kansas City, according to statements made by these firms.

Ground has been broken for the new factory of the Clark Engine Company, at Jackson, Mich. The company is associated with the Jackson Automobile Company, and manufactures the engines used in its machines. The new factory, which is to be a monster affair, will be located in the western part of the city.

The Knox Automobile Company, manufacturers of the Knox air-cooled cars, states that the Knox touring car that participated in the Glidden tour was the only car making a perfect score to carry six passengers throughout the trip. The Knox car's perfect score, in conjunction with the number of passengers carried, makes an excellent record.

The Welch Motor Car Company, of Pontiac, Mich, has sufficiently caught up with its orders to do away with the night sift of machinists. The purchase of the building which the company occupies will doubtless mean an addition to their capacity within a short time. New machines are being placed and the plant will be in shape to increase its output very materially in 1907.

The J. H. Sager Company, of Rochester, N. Y., manufacturers of the Sager equalizing springs for automobiles, states that its device can be readily attached to any automobile, whether of foreign or domestic make, without the necessity for making or buying any parts that are not regularly furnished with the springs.

The Manhattan Lamp Works, of 526 West Twenty-eighth street, New York, makers of the Saxon automobile lamps, state that they have no connection whatever with any other firm in New York using the name "Manhattan." Some confusion has arisen from a similarity of titles, and the Manhattan Lamp Works desires to avoid this.

L. L. Whitman, twice an automobile transcontinentalist, and still the holder of the record from San Francisco to New York, which he made with a Franklin, has been visiting the factory of the H. H. Franklin Mfg. Co. at Syracuse, N. Y., during the past week. Mr. Whitman has been representing the Franklin car on the Coast during the past year.

The Boston and New England business of the Kilgore Automobile Air Cushion Company has increased to such an extent that it has been obliged to open a shop at 41½ Columbus avenue, for the purpose of properly attaching the Kilgore air cushions to automobiles. The new shop has been running about two weeks, employing four operatives steadily. From present indications the quarters will have to be materially enlarged.

The action brought by Alfred H. Sours, of Rochester, against the McKinley Motor Car Company and Stanley R. Snook, also of that city, has been dropped and all the allegations made in the complaint, reflecting "in any way upon the honesty, integrity or honor of Stanley R. Snook," retracted. Mr. Sours says the action was begun in a moment of anger and that he is now assured that Mr. Snook has performed his duties in a competent and honorable manner.

The reports of the recent Los Angeles-Pizmo Beach endurance contest in California state that the Maxwell car, entered by J. W. Willcox, of Los Angeles, and which went through the run with a perfect score of 1,000 points, used but one-half pint of lubricating oil for the journey of 225 miles. There were three Maxwells in the run—a Model H, 16 horsepower, that carried six passengers a Model L runabout that carried two passengers, both of which finished with perfect scores. Another Maxwell in the contest, a 1905 Model H, finished with 998 points to its credit.

An official of the Electric Vehicle Company, of Hartford, manufacturers of the Columbia cars, states that his firm has been guided largely by the preponderance of practical opinion in the design of cars; and that while excellent results are obtained by observing reasonable limitations, the followers of faddists and extremists are sure to come to grief. The Columbia people claim that the location of both valves on the same side of the cylinder is an important advantage, as it requires but one camshaft and reduces friction and weight.

John Campbell, of St. Thomas, Ontario, president of the British Land Company, also president of the noted John Campbell flour mills at St. Thomas, has just purchased a large handsome Aerocar finished in wine color. After spending a few days at the factory receiving pointers about running the car, he went to the ferry wharf at Detroit, crossed over to Windsor, arranged matters with the Custom House officers and in fifteen minutes had started on a tour through Canada. Mr. Campbell was accompanied by C. W. Ellis, also of St. Thomas.

The Geneva Automobile Company has been incorporated at Geneva, N. Y., with a capital stock of $15,000 for the purpose of buying, selling and repairing automobiles and to conduct a garage. The company has bought the garage of J. A. Place on Castle street and will fit it up in a thorough and up-to-date manner. The following were elected as directors of the company: A. G. Lewis, Chas. S. Burrall, J. W. Mellen, T. H. Truslow and Walter A. Clarke. The directors elected A. G. Lewis, president and selected J. Murray Means as secretary and treasurer.

NEW AGENCIES ESTABLISHED.

The Aerocar Company has just established an agency at Cincinnati, Ohio, Jos. T. Monfort, at 227 East Fourth street, arranging to look after the trade in the city.

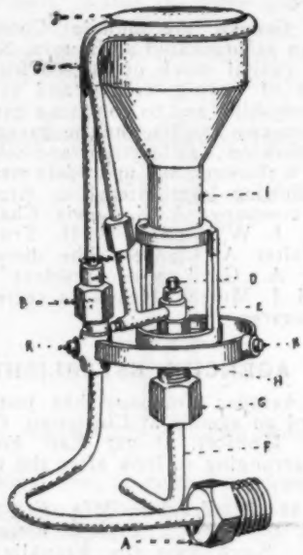
The H. H. Franklin Mfg. Co. have decided to open a branch house in Boston. Since 1903 the Franklin car has been sold in Boston by A. R. Bangs and the decision of the company to open a branch is the result of careful study of the Boston situation and a determination to give their large and increasing New England trade all the advantages to be gained from the location of a branch house in its buying center.

By the retirement of the Maryland Automobile Company, of Baltimore, the Automobile Outing & Transportation Company acquires the Knox agency for Maryland and the District of Columbia. An arrangement has been completed between the Automobile Outing & Transportation Company and the Motor Car Company, under which the first named becomes an operating company exclusively, taking over the entire garage business of both companies. The Motor Car Company becomes solely a selling company, operating its own as well as the Transportation Company's agencies.

Agencies have been established by the Wayne Automobile Company, of Detroit, Mich., with the following houses in their respective cities and towns: A. A. Schaffenburg, New Orleans, La.; Auto & Machine Co., Macon, Ga.; Auto & Motor Boat Co., Houston, Texas; W. H. Artzberger, Allegheny, Pa.; E. L. Benedict & Son, Coin, Ia.; T. V. Campbell, Galena, Kan.; Geo. V. Clough, Galveston, Texas; Dempster Mill Mfg. Co., Beatrice, Neb.; S. G. Graybill, Elizabethtown, Pa.; C. F. Hayes, Riverton, Ia.; Louis Henne Co., New Braunfels, Texas; Kerberg & Protexter, Sanborn, Ia.; C. Louis, 19 S. Water street, Ogdensburg, N. Y.; V. L. Nettleton & Co., Coldwater, Mich.; A. A. O'Neill & Bro., Norfolk, Va.; Osage Auto Co., Osage, Ia.; C. T. O'Ferrall, Jr., Dillon, S. C.; Sewell Page, Jr., Waverly, Ia.; John Slattery, Scranton, Pa.; C. E. Fitchiner, Binghamton, N. Y.; Webb City Auto Co., Webb City, Mo.; Percy Walker, Wenatchee, Wash.; J. F. Weathers, Columbus, Ga.; Witter & Hoch, Storm Lake, Ia.

LATE SPECIALTIES OF THE TRADE.

NEW PILOT LIGHT.—A pilot light for steam automobiles has been brought out by the Triumph Manufacturing Company, of Nashville, Tenn.; the device is illustrated herewith. The Triumph pilot consists of a drip cup, a valve *K* and a vaporizing coil *C* running around a mixing chamber *I* with



TRIUMPH PILOT LIGHT.

a solid top burner cap *J*. One end of the coil *C* is connected with the main gasoline supply pipe at *B*, and the other end fits into the valve jet at the point where a single valve controls the flame. This pilot light has been designed specially to avoid the formation of carbon deposits in small gasoline passages and to do away with joints exposed to the heat of the fire. The pilot light can be detached by unscrewing one union *A* where the supply pipe is connected. The operation of the Triumph pilot light is said by the makers to be extremely simple. The gasoline valve is opened until gasoline flows through the supply pipe and drips into the cup. The gasoline in the cup is then lighted with a match and in about half a minute the vaporizing coil is so hot that the liquid passing through it is gasified, and after passing through the mixing chamber and mingling with the requisite volume of air will burn with an intensely hot blue flame, which can readily be regulated by means of the valve. The tip through which the gas passes can be removed, and, if damaged, can be replaced at small expense. The manufacturers state that though the Triumph pilot lights have been in use for an entire season, they have yet to hear of a case of a pilot light clogging up, or of the plugging of a burner using this pilot light. Another specialty manufactured by this company is the Bell oil separator. This consists of a large tube, open at the top, mounted on a flange that takes the place of the flange holding the ordinary overflow tube in the water tank. Inside the large tube is fastened a smaller but longer tube with its lower end perforated. Water supply and oil discharge pipes extend through the flange fitting referred to. The oily water entering the tank from the condenser rises in the inner tube to the height of the water level in the tank, the oil gathering on the surface. The water entering the outer tube through openings at the bottom of the inner tube overflows into the tank over the top of the outer tube and the oil rising to the top of the inner tube is meanwhile carried off through the oil discharge pipe. The manufacturers state that the only attention required is to fill the water tank to the top of the outer tube, when the water causes the separator to automatically discharge the oil it has gathered. The oil and water pipes are placed sufficiently close together so that the oil discharge pipe is kept hot and the oil prevented from clogging when the tank is filled with cold water.

SEPARATOR.

NEW SPRINGFIELD CAP.—A new combination of cap and goggles for automobilists has been placed on the market by the Springfield Hat and Cap Company, of Springfield, Mass., under the name of the Springfield Combination. The front of the cap is of the popular automobile style, but

SPRINGFIELD CAP WITH GOGGLES FOLDED.

at the back there is a pair of goggles arranged to turn up or down. When the goggles are not needed they are folded up at the back and the cap is worn in the ordinary way. When the dust blows, however, or when the chauffeur hits it up a little, he

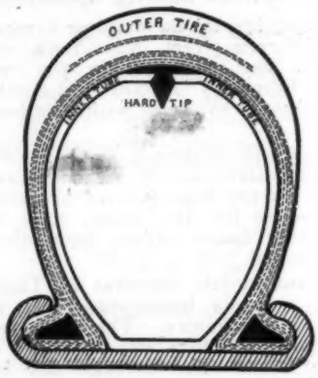
SPRINGFIELD CAP WITH GOGGLES IN USE.

turns his cap around so that the visor will be at the back of his head, and turns down the goggles to cover his eyes. The arrangement is an ingenious one and should be found extremely useful.

QUICK PUNCTURE REPAIR.—A quick and convenient method of repairing a punctured inner tube has been devised and placed on the market by the Huntington Automobile Company, of Huntington, N. Y. As the illustrations show, this takes the form of a plug, made entirely of rubber, with a hard point, and inserted without the use of cement. All that is necessary is to find the puncture, select a plug of the proper size, insert the point and the job is done. The manufacturers state that a little cement may be used as a lubricant to make the point

P. D. Q. TIRE PLUG.

of the plug slip in more easily, but the plug will hold air without the cement, being kept tight by the pressure of air within the tube.



P. D. Q. PLUG INSERTED IN PUNCTURE.

The plug is known as the P. D. Q. tire repair plug and is sold in boxes containing two different sizes.

GISHOLT MACHINE TOOLS.—As manufacturers of large machine tools for some fifteen years, the Gisholt Machine Company, of Madison, Wis., is well known to all users of such apparatus. The latest catalogues issued, however, are of special interest to manufacturers of automobiles on account of the adaptability of some of the machine tools, notably the turret lathes, to automobile manufacturing processes. One of the specialties of the Gisholt company is the "big bore" chucking lathe, designed for taking bars of large diameter. These tools are made with 3 1-2-inch, 5-inch and 6 1-4-inch holes in spindles, so that bars can be fed through and worked up by the turret tools. In handling chucked work it is often a great convenience to be able to firmly chuck a piece that would, in an ordinary lathe, overhang so that it would have to be supported by a back center to steady it against the cutting tool. In the "big bore" lathes such pieces, as long as their diameter does not exceed that of the hole in the spindle, can be passed back and held in the chuck solidly and without unnecessary overhang, giving the turret tools full opportunity to work. These lathes are made for belt drive or with individual electric motors, and are especially adapted to the use of modern high-speed cutting steels. The Gisholt turret and gap lathes are especially adapted to the work of shops where it would not be economical to install a lathe for doing one class of work only, but where there is a considerable variety of work requiring accurate duplication. The manufacturers state that these lathes are economical where parts are required in lots as small as a dozen. Special attention is given to the manufacture of cutting tool equipments for these lathes. The new Gisholt catalogues show a number of automobile and gasoline motor parts that have been turned out by Gisholt turret lathes